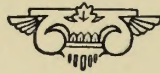


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THESIS

PREFABRICATED HOUSES, AN INDUSTRY ANALYSIS

by

MAURICE GROSSMAN

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HISTORY OF PREFABRICATION

Whereas there has been created in the past five years a more increased demand for low-priced housing than has ever existed in the history of the United States, the author has selected what many great minds believe to be the answer to this problem, Prefabrication, as the subject for a thesis.

Stimulated by higher and higher building costs through the years, men and organizations have spent much money and a great deal of time to perfect factory-made houses. Experimentation has taken place, using many types of materials not generally employed in house building, such as various metals, aluminum and concrete.

What is a prefabricated house? That is a logical question before this work progresses too far. The author does not have the answer, perhaps because there is no one answer. What prefabrication means will depend almost entirely upon to whom you are speaking. First, let it be understood that whenever the term "prefabrication" is used in the following pages, it refers to the prefabrication of houses only. Since the terms prefabricated houses, prefabricated housing, and so on appear repeatedly in the

ensuing pages and because the terms are awkward to repeat constantly, the substitute term "prefabs" may be used from time to time. By this name they are known both popularly and in the building trades.

"Prefabrication is all things to all men and a source of confusion to many"⁽¹⁾ so write two men who have done a great deal of research on the subject. To the Homosote Company it means making parts and walls in local lumber yards. To Roland Wank, Chief Architect of the Tennessee Valley Authority, it means building houses in two or three parts and delivering them by site to the lot. Still other companies sell their patents, or license them to builders throughout the country, and to them that is prefabrication. To a man of fertile and great imagination like Buckminster Fuller it means, in the future, a house that will be equipped with a full television set, an automatic laundry that returns a pressed shirt three minutes after it has been put in, and an automatic shower that cleanses and dries you all by a soapy mist which leaves no mess and can be put right in the living room. To Farwell Bemis, prefabrication meant the chance for every man, regardless of how poor, to own a home. To Mr. E. F. Hodgson it means building a house to each individual's specifications similar to a conventional house, but to do it in the factory instead of on the site. So you see, there is no one

(1) Bruce and Sand Bank "History of Prefab"

definition of what "prefabrication" is. For the purpose of this thesis we will define "prefabrication" as "the factory production, by a manufacturer of standard homes through the application of volume production techniques". (1)

The search for prefabrication has been given impetus by the ever present need for houses which will fit the pocketbooks of the masses. When prefabrication first was started is impossible to determine, but the general movement emerged as a product of the great depression of the 1930's. At that time 87% (2) of the people in the United States were earning less than \$2500 per year. Many of these people were forced to live in old, deteriorated, formerly expensive homes because it was almost impossible to get a house to fit the pocketbook of a man making much below \$2500. In normal times it is impossible to build a home worth living in for much less than \$5000, and this is still much too high for millions of people who would like to own homes. It is the mission of the prefabrication industry to lower this figure. Every dollar which can be sliced from the cost of a home admits many, many people to the great fraternity of "Home Owners". Foster Gunnison, president and founder of one of the leading prefabrication companies, claims that under normal conditions of adequate

(1) Headlines, "Prefab Homes, Report on, " Nov. 25, 1946
(2) Bruce and Sandbank, "History of Prefab"

supply and full production, he will reduce the cost of a house by one-third less than a conventional home of the same type. (1)

Although a little work was done in the prefabrication of houses during the First World War to house war workers, very little was really accomplished until after 1929. There was much talk and agitation to use the idle plants of that depression era to manufacture houses. A company that started operation in that period is today considered an "old-timer", so the reader can see how relatively recent the prefabrication movement is.

Early experiments were usually made by companies trying to adapt their products and their machinery to the manufacturing of houses. (2) This, of course, was an attempt to create a wider market for their products. American Rolling Mills, United States Steel, and Republic Steel tried to use steel in the manufacture of homes. Many wall-board companies tried to employ wall board in the prefab of houses, and the plywood people attempted to adapt their product for the new market. One of the leading prefabricators today, Homola, was started by Jacques Willis as an outlet for his plywood. (3) Besides the established companies, many new ones were formed specifically to produce homes. Many got models made, but never into production.

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- (1) F. Gunnison, "Economics of Mass Distribution of Homes"
information supplied by Gunnison Homes Incorporated
 - (2) Bruce and Sandbank, "History of Prefab"
 - (3) Bemis Foundation Files

Many an architect was sure that he had the solution to the problem, and incidentally, a plan to make himself a rich man. Even today architects are continually devising new ways to prefabricate, and incidentally, enrich themselves, only to find that someone thought of the same system twenty years ago. They soon learned that the problem wasn't in devising methods of manufacturing, but in getting the houses built and sold. (1) However, from the maze of many trials and many failures, did emerge some of the basic ideas and methods employed today in the prefabricated house industry. (2)

While the experiments referred to in the above paragraph were being conducted by private business concerns, many independent research bureaus were contributing greatly to the development of the mass production of houses. The three most important organizations in this category were the Bemis Institute, later the Bemis Foundation, the Purdue Research Foundation, and the J. B. Pierce Foundation.

In 1921 Mr. A. Farwell Bemis founded the Bemis Institute, Inc. (3) The organization was chartered as a non-profit corporation for the purpose of conducting experiments in the field of housing. Mr. Bemis, a man of vision, and with a deep feeling for his less fortunate brother men, felt that every man, regardless of what his

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- (1) Interview, Mr. B. Kelly, Bemis Foundation
 - (2) Bruce and Sandbook, "History of Prefab"
 - (3) Information on Mr. Bemis, obtained by interview at Bemis Foundation. I talked with an old employee of Mr. Bemis

income, or station in life, should be able to own his own home if he so desired. Mr. Bemis was also a man of action, and he was determined to do all that he could to see that his wish for mankind become a reality. He therefore, was conducting experiments at great personal expense with materials to be used in prefabrication long before the general public even knew what the word meant.

Upon his death, Mr. Bemis bequeathed a great sum of money to be used in experiments and research aimed at the betterment of housing. To fulfill the terms of the will, the Bemis Foundation was created at the Massachusetts Institute of Technology. This Foundation is engaged in research and experiments in the field of prefabricated housing. It is felt by these men who have studied the situation that if the house is ever to come down in price so that the masses can afford to purchase it, it must be manufactured by modern mass-production methods.

The Bemis Institute developed one of the first all-prefabricated house settlements in America. In 1923 at Wellesley, Massachusetts it started a twenty-two house development, experimenting with the use of pre-cut wood panels combined in construction with concrete. The Bemis Industries was untiring in its effort to find one material that would provide structural strength, insulation, and wall surface.

The John B. Pierce Foundation was founded to fulfill the terms of the will of the late John B. Pierce, Vice

President of the American Radiator Company. It was chartered in 1924 to carry on research in the fields of heating, ventilating and sanitation. (1) The execution of the will led eventually to the study of prefabricated houses.

In 1932 The John B. Pierce Foundation erected its first experimental house on the top of the Starret-Lehigh Building in New York. This house was used to experiment with materials that would give structural strength and wall-surface. It tried many products such as plywood, composition board, and concrete, with varying success.

The Foundation continued to erect many houses on many different types of frames and employing various surfaces until the War. Some of these houses were marketed during the war in order to aid during the emergency.

The Pierce Foundation has done much work in an effort to find the most efficient, economical floor plan which could be most advantageously developed for use in low-cost housing. Their conclusion is that the 24 x 28 house is the best, and this has been the standard used by many of the leading prefabricators.

The Purdue Research Foundation is another privately endowed research organization which has been doing work in the field of prefabrication, and materials to be used in prefabricated houses. In 1935 this organization developed its first project. It was a group of five types of houses

(1) Information on the J. B. Pierce Foundation obtained from Bruce & Sandhook, "History of Prefab"

built for the purpose of finding a house that would be adequate, and yet sell for under \$5000. Conventional builders have made little progress in erecting an adequate house that will be sold to the consumer below the \$5000 figure. (1)

During the war the Purdue unit was actively helping commercial companies with their problems. (2) Companies that were building "prefabs" ran into much trouble finding available material, as did all other industries. These concerns would take their problems to the research unit at Purdue and they would try to develop some new material to do the job.

Some of the colleges have contributed directly toward the manufacturing of houses. The University of Illinois, has, perhaps done more than any other school in the country. The focus at Illinois has been upon insulating, heating and air-conditioning problems. Courses in building construction, such as those now offered at Yale, Massachusetts Institute of Technology and Hampton Institute, while not directly involved in prefab. are stimulating interest in new methods and new materials. The Mellos Institute of Pittsburgh has also done much work toward development of new materials. (3)

Various government agencies have contributed greatly toward the advancement of prefabrication. The

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- (1) Bruce & Sandhook, "History of Prefab"
 - (2) Bemis Foundation, Interview
 - (3) "Rational Design" Bemis

Bureau of Standards has conducted tests on many of the materials used in prefabricated houses. One trouble in the early days and still existing today, is that the companies are competing against each other instead of trying to develop new methods for the benefit of the whole industry.

Effort toward a unification of experiments was started in 1934. A cooperative activity centering in the Bureau of Standards had as its primary aim the standardization of building materials. It had been endorsed by many groups, including the American Institute of Architects. (1) It is this type of unified effort, if carried on to a great extent, that would inevitably lower the cost of the house for the consumer. The Bureau of Standards has also developed a standard of requirements which is very helpful to the manufacturer. (2)

The Forest Products Laboratory, in its efforts to utilize lumber has experimented with the use of wood in prefabrication. In 1935 it erected the first "stress-skin" plywood house which was the most widely known prefabricated house of that period, and in 1937 it developed a second house along the same principle. (3)

Real impetus was given to the prefabrication cause by two other government agencies--the Tennessee Valley

- (1) "Rational Design" Bemis
- (2) National Bureau of Standards, "Prefab Homes, Commercial Standard" CS 125-45
- (3) U.S. Dept. of Agriculture, Forest Product Division, "Progress Report on Houses under Development"

Authority and the Farm Security Administration. These two agencies found prefabrication the answer to their own peculiar problems. They actually erected many whole communities of prefabricated houses. They have attempted to stimulate low-cost house production on a genuine mass-production basis. While many agencies and research units experimented with one or even a few houses, these two governmental organizations were the first to employ prefabrication on a large community basis. (1)

TVA experiments stemmed primarily from the need for housing facilities in remote places for their own construction workers. It was a problem peculiar to the TVA's work at that time which had to be solved. Large groups of men were going into remote, uninhabited regions to erect power plants and stations. The work took a long time and some sort of stable housing was necessary to quarter the men. However, once the construction was done, the houses were no longer necessary at that spot, but as the men moved on to other remote regions, housing was necessary there. The answer, of course, was some sort of house that would be stable and secure while in use, but could easily be de-mounted, transported to another site and set up again.

Chief TVA architect, Roland Wank, devised just such a house. Built at a factory, the house was trucked

(1) Bruce & Sandhook, "History of Prefab"

to its site in two or three units. The house proved so satisfactory that it stimulated the use of prefabs for the permanent TVA communities.

Appraisal of the contribution of the government toward the advancement of prefabricated houses during the war period is incalculable, both directly and indirectly.

Directly, prefabrication went ahead with leaps and bounds under the sponsorship of the government. Leading prefabricators have claimed for years that they could produce, that they were ready to produce, if they had the money and the market. The government prohibited both of these. Many people claim that prefab. units erected during the war did harm to the industry because the products were not of first class nature, and not the type which people would live in as permanent homes. The critics contend that by building dwellings of this nature the public for years will associate the name of "prefabrication" with those hastily constructed, temporary, war-time shelters. The author does not hold with this view. The government approved all plans before construction and placed a ceiling on the price of the product. They were approved for temporary war-emergency housing, and they did their job well. If the prefab industry is to get a "black-eye" because of war work, so too is the conventional construction industry. Were not the products of the conventional builder just as shoddy and dismal looking? How many

people would like to call "home" (permanently) the dwellings which the conventional builders erected to house war workers. It was a case of getting something up, and doing it in a hurry, with the ever-present realization that it was a temporary proposition.

No history of the prefabricated house industry would be complete without a word about some of the men who pioneered in it. There are many men who had their hand in it, in the early stages of development, and if some are over-looked who are deserving of mention, it is unintentional.

Already mentioned is Farwell Bemis and the work he has done. Mr. Bemis was years ahead of the field many years ago. He advocated a complete change in the structure of the house, doing away with all of the uneconomical methods and structural parts in the conventional house. Mr. Bemis felt that the house should be "rationalized". By that he meant "the ever continuing, evolutionary process by which an activity, a custom, a technique, an industry, is brought up to date, into balance, into harmony---that is, becomes rational with respect to other things". (1) Mr. Bemis, in his book, said that if Benjamin Franklin were to drop back to his old haunts in Philadelphia, he would see many things that would amaze him and which he would not

(1) Bemis, F. W. "The Evolving House"

understand. He would in no way connect the airplane with the horse, nor any other modern invention with its yesteryear counterpart, but he would have no trouble in determining that a house was still a house. Mr. Bemis wanted to bring the housing industry on a par with other modern industries. He claimed that the house, if redesigned and produced with standardized, interchangeable parts under modern mass production and mass distribution techniques, could be available to any man who could own a car--That such a man could also afford to own a house, if he so desired, without shackling himself to the bank for most of his adult life.

One of the grand old names of prefabrication is Grosvenor Attebury who has been a practising architect since 1895, and a practising prefabricator for almost as long. Mr. Attebury is responsible for one of the oldest prefab communities in America. In 1907 he had built an experimental structure which was little more than a hut, formed from hollow, pre-cast concrete panels which he had developed earlier in his studies abroad. This system became known as the "Attebury System" and was used extensively by him in 1910 in constructing the Forest Hills Gardens Development for the Russell Sage Foundation. The entire shell of these houses was constructed of pre-cast, hollow concrete. The material, as produced in the mould at the factory provided both interior and exterior finish. The result was a single, economical wall unit, complete as soon as it was put in place,

damp-proof, and it required practically no maintenance.

The houses, when complete were a great success. Time has proven that the technique that produced them, was good--a house that was strong, trouble free, liveable and durable. Its difficulty was similar to that of other concrete houses. The units were heavy, therefore difficult to transport, and required a great outlay for plant and machinery to start operating. It is almost certain that when there is sufficient demand and acceptance for prefabricated houses, to warrant the huge outlay of capital which is involved, that some system of pre-cast concrete as advocated by Grosvenor Attebury will be successful. (1)

Credit, too, to Ernest Flagg who successfully simplified traditional structure, improved its quality, and reduced its cost. Among the architects, Frank Lloyd Wright long has preached and written that his brothers should change their ways and modernize. (2)

One of the best of the old timers still in business is Foster Gunnison of Gunnison Homes. Many pick Gunnison homes to be the "General Motors" of the prefabricated field. They make this choice for two reasons: first, because United States Steel has bought a controlling interest in Gunnison Homes and this gives the company the financial wherewithal to withstand some more hard days; the second reason is

(1) Bruce & Sandhook, "History of Prefab"
 (2) F. Bemis, "Rational Design"

Foster Gunnison himself. Mr. Gunnison is an aggressive, sales-minded man who is sold on "prefabs". He is so enthusiastic about them that his has become, perhaps, the number one company in the field. He believes truly in the "mechanized plant" (1) for the production of homes and he is copying his technique direct from the automobile industry. He claims that under normal conditions his company will put out houses of similar quality as conventional builders for one-third less money. His plans for distribution of the house will be discussed in a later chapter.

Ed Green of Rockford, Illinois is the head of "Green's Ready Built House Company". Mr. Green was one of the first in the field to produce and he brings a minority view into practice. He intends to produce a higher price house, but give you the conveniences to be found in a still higher priced house built the conventional way.

When you think of prefabrication there are many other leaders, too numerous to mention, but all deserve credit for getting the baby industry started. There is Buckminster Fuller, and his Dymaxion Dwelling Machine; Martin Wagner, professor at the School of Architecture, at Harvard, who invented the "Iron Igloo". Even the great inventor, Thomas A. Edison, tried his finger at developing a house. He sought to develop a system to mass produce concrete houses as early as 1908. (2)

(1) Fortune, "Where is Prefab" April, 1946
 (2) Bruce & Sandhook, "History of Prefab"

The history of any industry is but a collective history of the men and companies that made up that industry. To show from what has sprung this new American industry, a few of the companies, their origin and present status will be discussed.

It is fitting that the first company to be reviewed be the oldest existing prefabricated company in America. That company is the E. F. Hodgson Company of Boston, Massachusetts. It is the story of a firm that grew from within itself from humble beginnings because a man, old Mr. Hodgson, had faith in his idea.

When the founder, E. F. Hodgson, was a young lad his family moved to the country, Dover, Massachusetts, because of the boy's poor health. The country air did young Hodgson good, and also gave his creative ability a chance to come forth.

In 1890 Ernest Hodgson built his first prefabricated unit. It was a chicken brooder which he built in sections in the attic of his home and later assembled outside. Some one saw his original one, liked it and bought it. Ernest, being enterprising as well as inventive, decided to try some more, which he did and also sold. He delivered them to the surrounding towns in a horse and wagon and erected them for the people.

The brooder, which he called "Peep of Day" became quite famous locally, and a merchant bought the patent

from the young inventor. This money, plus his profit on the brooders he had sold, gave him enough capital to erect a little factory on the present site of the company factory at Dover, Massachusetts. In this factory he made poultry houses in sections, hauled them to the freight yard in his horse and wagon and shipped them to an ever-growing clientele.

The business was growing and Hodgson was hiring more men all the time, and also advancing in the field of prefabrication. His next step was garages. Then he added small camps to the line, and finally graduated to small houses. Hodgson houses have stood the test of time. Many sold in the early days are still in use, such as the one sold Denman Thompson, the famous old actor, in 1905. Also, the one purchased by the Grenfell Association which was transported to Indian Head Harbour, Labrador and erected there, still stands. Mr. Hodgson kept abreast of modern times, always improving his houses and camps as new materials were developed.

Heretofore the Hodgson Company was not catering to the mass market, but rather building camps and small houses for erection in out of the way places where there were no conventional builders. However, with the present increased demand for houses Hodgson Company will turn to this field. The immediate plans of the company are difficult to determine at this point because the founder, Ernest F. Hodgson, retired not long ago and sold his company to

another old and alert prefabricator, Allied Houses of Langhorne, Pennsylvania. (1)

The E. F. Hodgson Company is a type of company that started small and grew from within to become a leading concern over a period of years. This type of growth is in the minority. More common is the story similar to the one of the Home Ola Corporation. Men who were already very successful in other fields realized the great potentialities of the new industry. HomeOla is one of the largest companies now producing homes. (2)

Mr. Jacques Willis, president and founder of the Homola Company was originally a plywood tycoon. At one time the automobile industry was the greatest user of plywood in the country. However, when they made the switch from plywood to steel this left the plywood producers without an outlet for their product.

The plywood manufacturers first attempted to get the lumber dealers to sell their product as a wall covering. This was not too successful because of the high cost involved to plaster over plywood.

In the middle thirties there was a great deal of talk concerning a new industry--prefabricated houses. Mr. Willis decided that he would try to create a market among the prefabricators for his product, plywood.

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- (1) Information on Hodgson Company obtained from personal interview with Mr. E. Hobbs, an employee of long standing with the Hodgson Company.
 - (2) All information on the Homola Corp. taken from report of interview between R.J. Willis, son of founder, and a representative of the Bemis Foundation

Mr. Willis developed a "stressed skin" method of panel construction and formed the Willisway Company in 1938 as a designing organization for anyone who wanted to prefabricate houses. Once Willisway sold a prefabricator on the system, they were assured of the sale for their plywood. As Mr. Willis said, they came in the front door and sold a customer on Willisway, then came in the back door and sold them the plywood.

In 1941 the United States entered the War. In 1942 plywood became a very scarce item and Willisway changed their method of operation. In order to best utilize the small amount of plywood which they now had available, a new company was formed, the Homeola Corporation, to manufacture prefabricated houses.

It has been shown that the prefabrication movement first emerged as a result of the depression. The first trials were not too successful so far as selling the public was concerned, but many ideas were experimented with. Prefabs rarely got off the drawing boards until this War when they answered the call as did other industries. Now the post war era is here, and the prefab companies, wise from previous mistakes, are about to assault the market.

In the following chapters the obstacles which confront them will be discussed and an attempt made to appraise their chance of blossoming into a large scale industry.

CHAPTER II

SYSTEMS

In the preceding chapter a brief sketch was given of the early days of the prefabricated house industry. In later chapters problems confronting the growing industry, and how the industry intends to operate, will be discussed.

Before these problems can be examined, a clear understanding is necessary of what the industry is. Any industry is merely a collective picture of the individual companies that go to make it up. Therefore the writer has selected, for description, the products of eight leading companies to illustrate what is being offered to the public.

There are several types, or systems, of prefabricated houses which are either in production, or very close to being in production.

By "System" is meant either method of production, or type of material used. For example, two companies might produce a panel house; one might be from aluminum and the other from wood. Therefore their systems would differ as to materials used. On the other hand, two companies might produce wooden houses, one building houses in a factory to special order, and the other employing a true belt-drive assembly-line method. Obviously, these systems differ as to method of production.

In the following pages will be given examples of each of the major types of prefab. houses. There is the house made in the factory of conventional materials, which will be illustrated by the Shelter Industries Home and the Precision-Built System Home. The all-steel house is illustrated by the famed Lustron Corporation's product. There is even a system which makes homes of light-weight, but strong plastics, and this will be represented by the Lincoln Home Corporation. A portable home, which is really substantial, is the product of Wingfoot Homes, Inc., a subsidiary of Goodyear Rubber. An aluminum home is designed, produced and marketed by the Butler Manufacturing Company. The final two houses described are products of companies that do no manufacturing themselves, but merely license the patents and possibly equipment to others who do the actual manufacturing of the houses. In this category are the General Panel Corporation and the Vacuum Concrete Company, whose house is a permanent concrete building.

The writer believes that this covers examples of all of the major systems of prefabrication in use today.

SHELTER INDUSTRIES HOME (1)

The Shelter Industries House is a two-bedroom home of permanent construction, designed to meet all Federal Housing Administration space and structural requirements.

(1) "Shelter Industries Factory Fab Home" Prefab Homes,
May, 1946

It will sell for \$4685 F.O.B. the factory, (Trenton, New Jersey). This house is constructed from stressed-skin plywood panels, which are used throughout for floor, exterior and interior walls and roof. The stressed-skin is the type of construction developed and used extensively in the airplane industry. The wall panels of the house are four inches thick and made from a ribbed plywood known as Weldtex. Floors can be either plywood, or a pre-built cement.

The manufacturers assert that the house is thoroughly weather-resistant and that a model has been in actual use for six years in Providence, Rhode Island, and has survived all kinds of weather very well. Walls, roof and floor are fully insulated with a two-ply aluminum foil insulation providing three separate air spaces between the panels.

The price of the house includes a completely equipped central unit consisting of kitchen, bathroom and heating facilities. This unit is well publicized as the Borg Warner's "Mechanical Core" in the Fortune, April, 1946.

The basic home has thirty-five square feet of closet space, with five clothes closets, a linen closet and a kitchen storage-utility closet. The kitchen has twenty-seven square inches of shelf space. The house is scientifically planned to save the housewife as many steps as possible.

The houses will be distributed through local agents who will have a franchise in their region. These representatives will sell, deliver and erect the homes at an over-all price. The land will be purchased separately by the customer.

The house might be called semi-conventional in appearance. While it is not a flat-roofed angular affair, it is not of the Cape Cod style either. The chief criticism is the size of the house. To say that it is compact is a gross understatement. In the two-bedroom model, one of the bedrooms is only 7' 7" x 9' 3". However, in a period such as we are now experiencing, a house that will sell for under \$5000 with all the features of the Shelter Industries House, (Mechanical core, etc.) is welcome to many families of limited income.

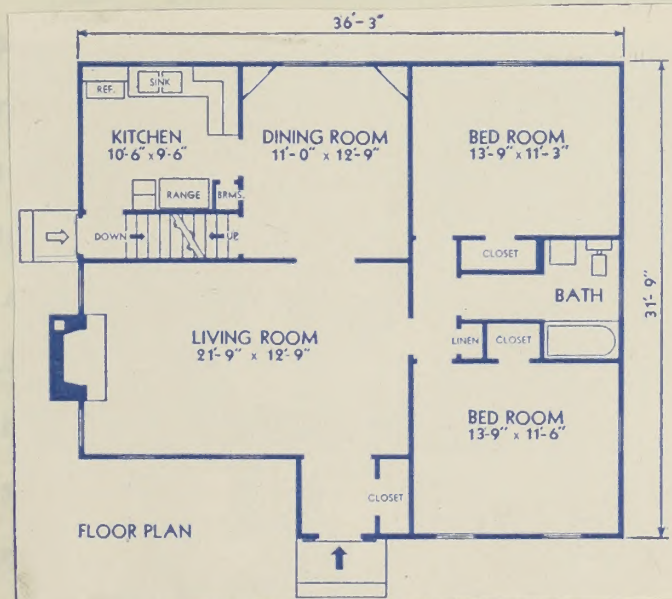
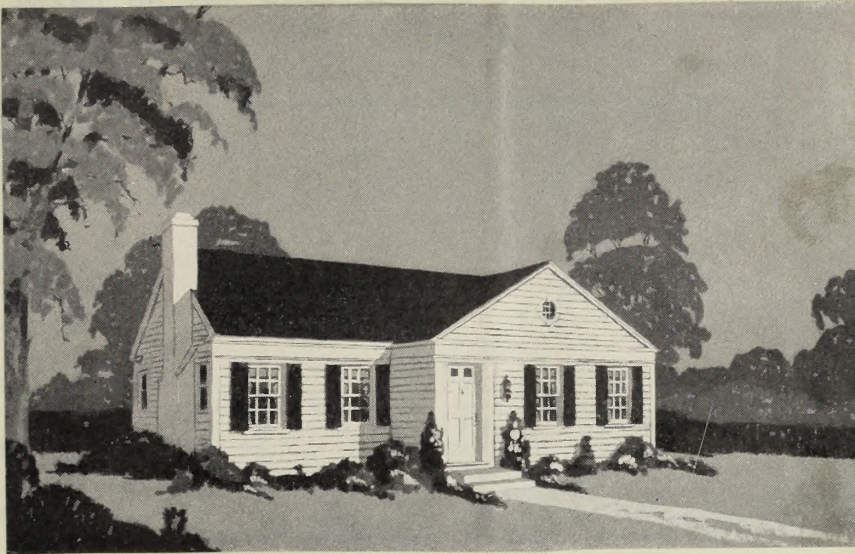
PRECISION BUILT SYSTEM (2)

The Precision-Built Homes is a subsidiary of Homosote Company of Trenton, New Jersey, a manufacturer of building materials.

The Precision-Built house is based on the modular system of construction, first developed by Farwell Bemis. A Modular design is one which "assumes the use of a common unit of measure (or module), standard sizes of parts and

(1) Wilson, Vaux F., Jr. "Tomorrow's Homes"

PRECISION BUILT SYSTEM



accessories based on this module; house plans and layouts also based on the module, and complete standardized details consistent with, and incorporating all of the modular features". (1)

Precision-Built houses, like so many others, realize that the public is not yet ready to accept a very radical house, and so, although they use the modular system, which means standardization of parts for greater economy, their house, when complete, looks like any conventionally built house.

The final appearance of the house need be far from standardized. More variety could be obtained if the purchaser had worked at the plans with an architect. The house can be all frame, with any outside surface desired--from novelty siding to stucco. In fact, it does not have to be a house at all. It can be a camp, store or apartment building. But it will all be constructed from factory built parts and assembled at the site.

All of the lumber which goes into the house is pre-cut at the factory on power saws, which of course eliminates the slow, custom-made work of a conventional house. Walls and partition sections are prefabricated in the factory on a jig table. Ceiling sections also, are built by specialists in the factory. Hardware is put on the doors,

(1) Wilson, Vaux F., Jr. "Tomorrow's Homes"

and they are mortised for locks, all at the factory.

The different feature about the Precision-Built house is the large, over-size panels which they use. The average building board comes in 4 x 8, but in Precision-Built houses, panels are employed that are as large as 8'2" x 20'.

Studs are framed on a jig table and the Homosote panels are applied flat. This single feature saves a great deal, as it is much more economical than erecting vertically, on the site. Precision-Built houses have no frame bracing, such as is used in a conventional house. The manufacturers claim that their tests prove that this method of Homosote applied to a precision-built panel is 30% stronger than diagonal sheathing applied conventionally. The precision-built panels are glued instead of using the customary nail. This they claim is also stronger.

The panels are transported to the site by truck. They can either be laid on the body, or tilted against a tripod similar to glass. The manufacturer claims that it takes less time to load the panels and truck them than it would the individual parts of which they are composed.

After foundation is put in, the sills, floor joints and sub-flooring are shipped to the job and are installed. After the sub-flooring is laid, the walls and partition panels are put up.

A one-story house can be "under roof" in one day, with additional time (one day,) required for two-story homes. This enables work to go on right ~~through~~ the normally slow building season, because only two good days are needed to get a house under roof. In extremely cold climates where the ground is so frozen that foundations cannot be put in, the house can be built on skids and put on a foundation after the ground has thawed out.

The precision-built people claim their house is more economical to run, and this savings has been reached with no loss in quality through factory-controlled costs.

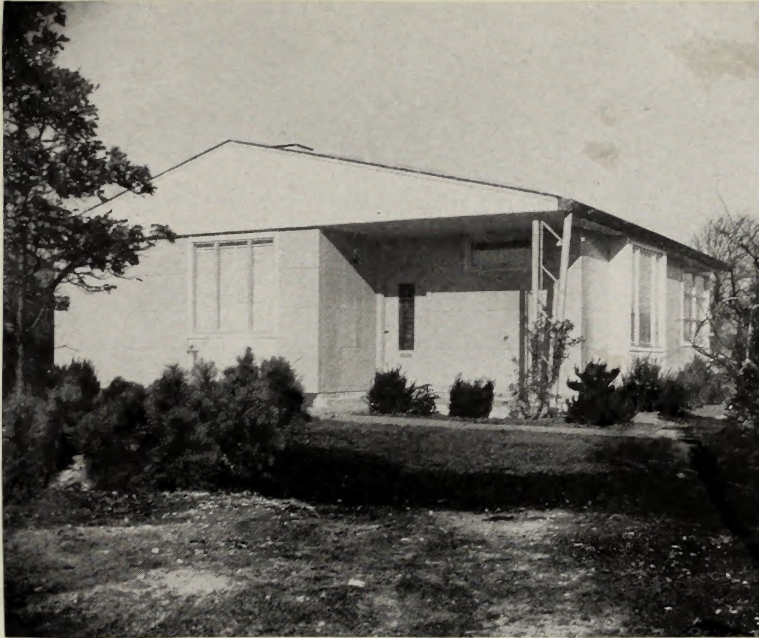
The writer believes the Precision-Built houses to be a great compromise, hardly worthy of what prefabrication promises. While some economies are effected, much more is done on the site than is done by most prefab. systems. The product seems reliable, but the writer likes to feel that some day "prefabs" will solve the housing problem by industrializing the building industry. The Precision-Built System is closer to the Conventional Builder than to the true industrialized house, for the manufacturing is to be done almost wherever there is a dealer, merely by license from Precision-Built. This is not a true, factory built house. However, it is a little step along the way, and it promises to be a popular one.

LUSTRON (1)

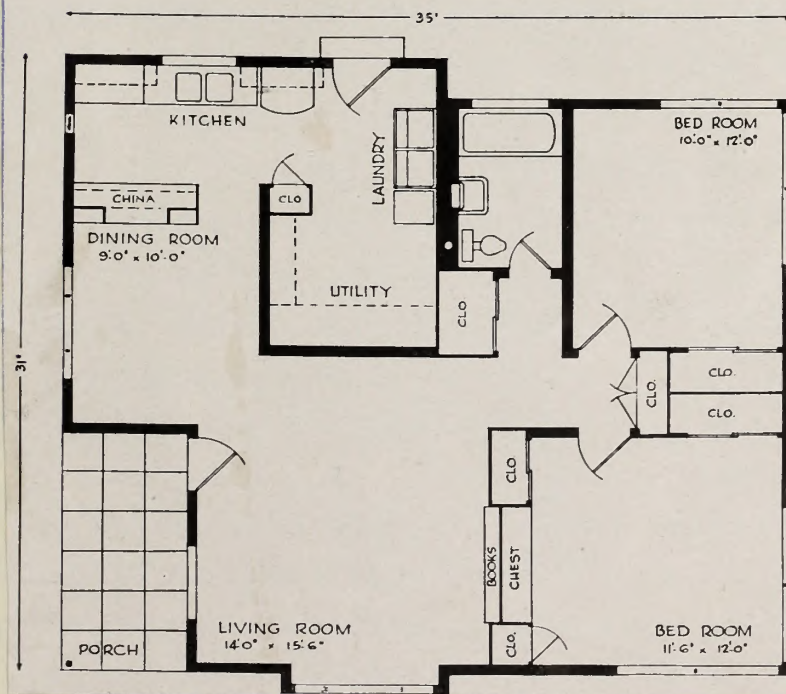
The Lustron Corporation is a subsidiary of the Chicago Vitreous Enamel Company of Chicago, Illinois. The writer has selected this as one house to report on, even though they are not yet in production, and do not expect to be until the Summer of 1947, because of the great amount of publicity which they received in connection with the now defunct Wyatt Housing Program. This company, also, is interesting because it is not one of the long-established prefabricators, but is definitely a war-born prefabricator. In fact, they are not even war-born, but are a post-war concern, attempting to take advantage of the serious housing shortage to sell their houses. Finally, they are interesting because of their unconventional steel house. Indeed, the development of this concern will be worth noting.

The idea for the house grew from a filling station. Originally the company came to Washington to secure approval for a packaged filling station which they intended to manufacture. They previously had manufactured panels for filling stations. The National Housing Administration thought the design suitable for housing and influenced them to enter this field. They then went ahead and developed a steel house, made up of vitreous enameled panels of steel fitted onto a vitreous enameled welded steel framework. Working with this type of material the company is also in a

LUSTRON



FLOOR PLAN OF LUSTRON MODEL HOUSE



position to manufacture all of the other equipment for the house, such as sinks, bathtubs, lavatories, laundry trays, etc. if their volume is large enough to warrant it.

The plan of the house is to be a close-spaced steel form of construction. It is predicated on the proposition that steel is more adaptable to an industrialized production of houses than other materials. The house will have a pitched roof and be 31 x 35, with 990 square feet. It will be built on a special type of foundation made of the enameled product. The wall structure will consist of 8' x 8' steel frames, welded together and completely vitreous enameled after welding, with the vitreous enamel applied to both sides of the steel panels.

The heating system of this house is a ceiling plenum chamber designed as a radiant heat panel and about 5% of the warm air is bled off into the walls to keep them fairly warm.

Partitions are constructed similarly to the exterior walls. A good many of the partitions will be formed by working wall units. The wall between the living room and the master bedroom, for example, is formed by a recessed book case on the living room side, and a dressing table, closet and drawer wall on the bedroom side,--all to be stamped out of vitreous enameled steel. Space between the kitchen and dining room has another working wall, one side

a china cabinet, the other a cabinet or buffet. The 2' x 8' interior panels have a series of vertical grooves which give a pleasing decorative effect and emphasizes the joints. The doors and windows also will be of steel.

The ceiling is formed of enameled pans screwed to the lower cord of a welded steel truss. The truss assembly forms the framework for a second ceiling six inches above this, which is the top of the heating plenum chamber.

On top of this plenum chamber is a layer of glass wool insulation which prevents the heat from being directed upward. The roof covering is simply a series of longitudinally placed enameled steel pans, screwed to the trusses.

The colors are of a permanent material, which reduces upkeep cost and repair cost considerably. But if the occupants desire to change the color, it can be painted over.

The house will sell for about \$7000. Of course, this is not cheap, but bear in mind the period we are passing through. Also, a basement is not really necessary and the elimination of this saves about \$1000.

The Lustron House is definitely a revolutionary idea to the average man. As early as 1932 steel houses reached the experimental stage. The net result is surprisingly conventional looking, but the materials are not at all what the average person thinks of as housing materials.

Perhaps Lustron has the correct idea and steel will be the material used if ever the house is truly industrialized. Only time will tell.

THE LINCOLN HOME CORPORATION (1)

Lincoln Homes Corporation produce a home called the Lincoln House. It is named after its inventor, Charles P. Lincoln, Jr. who is president of the company. During the war Mr. Lincoln built radar plane housings, which are essentially the same construction as the houses. Lincoln Homes themselves, do not intend in the future to manufacture. They hold patents on the newly developed process and will license firms to use it. Many aircraft companies have expressed great interest. (At present they are attempting to produce.)

The basic Lincoln Home contains two bedrooms, bath and living room, kitchen, dining room and general utility room. Another bedroom can be easily added. The price of the basic house will range between \$3500-\$4000. This price is exclusive of the lot of land, but does include the heating unit, installation of electricity and plumbing fixtures as well as erection on the home site.

The Lincoln House is constructed from laminated plastic panels. The panel construction is of a special

(1) Information on Lincoln Homes from report printed by the company.

heavy paper shaped into huge cells comparable to those of an ordinary Christmas bell, covered with aluminum. The Structural Core is expanded and impregnated with a phenolic resin. The core is sealed between facing sheets of aluminum and the panel is sealed with a vapor barrier. The result is a lightweight panel of great strength. An entire house built of these plastic panels weighs only one ton, compared with the forty tons which a conventional house of similar size weighs.

The panels are sealed against moisture; however, as an added protection the paper core is impregnated with a quantity of phenolic resin which makes the core material stronger after continual moisture exposure than the original paper in a dry state. The material has a remarkable insulation against sand, heat and cold changes, and is impervious to dry rot, termites and other destructive factors.

Roof panels of three inch thickness, employing a protective cap moulding over the sealed joints are used. The walls are capable of carrying a vertical load of five thousand pounds per lineal foot, which compares favorably with an eight ~~foot~~ high, one foot thick brick wall.

Doors are of panel construction with a thin wood veneer that gives the material a solid wood appearance. They weigh only seven pounds, compared with the twenty pounds for a solid wooden door, and they therefore do not slam.

The house is built on any standard masonry foundation. The floor is a two-inch thick concrete floor.

The method of heating the house is expensive, yet very satisfactory. The heat comes from a unit installed in an area three feet beneath the floor. The house is heated by radiation, through the concrete floors, and by connection through small registers placed conveniently so as to permit warm air to rise into the rooms, and the registers also permit the circulation of cool air in the summer. There are no pipes, and at the same time it does not take any of the living space in the house.

The big question which might come into the mind of the layman when a house of such light materials is discussed, is "Is it strong enough?" It has been concluded by governmental agencies that a three inch wall panel as designed by Lincoln, will be adequate in all climates where the temperature does not drop below twenty degrees Fahrenheit. In warmer climates the two inch wall is satisfactory if the climate does not drop below zero. Houses already erected have been insured against fire at rates 34% below neighboring conventional dwellings.

Lincoln Homes as yet is not in production. They have a plant in Marion, Virginia, where they are attempting to get rolling. It is certainly an interesting company,

and system, and quite possibly Lincoln has the beginning of the answer to real low cost housing.

WINGFOOT HOMES, INC. (1)

A truly different attack or outlook is taken on prefabrication by the makers of the Wingfoot Home. The house, while very different, is not to be taken lightly if for no other reason than the fact that it is being produced by a subsidiary of one of America's ten greatest industrial companies, Goodyear Rubber. Mr. J. C. Thomas, vice president of Wingfoot Homes claims there are 15,000,000 families in this country living housed under conditions much inferior to those offered by the Wingfoot Home, and they are going after this market.

At the present the homes are being turned out in only one plant at Litchfield Park, Arizona, and are distributed only in the adjacent states. In the future they intend to produce homes in large quantities in other plants and distribute on a much larger scale.

The Wingfoot Home is a portable three-room efficiency apartment. This cozy, modern low cost home consists of a T-shaped unit made up of panels and so designed that the unit can be telescoped within itself and still be a

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- (1) Information on Wingfoot Homes from files Bemis Foundation
 - (2) "Inside View of Wingfoot Homes" Building Supply News, April 1945.

completely assembled unit. It is completely pre-assembled at the factory and delivered to a lot, ready to move into as soon as the utility connections have been made. In general, it weighs about sixty-five hundred pounds, is twenty-six feet long, approximately eight feet six inches high, and telescoped at the factory to a package not over eight feet wide. This package can be legally transported over any highway or railroad without special permits. In its extended condition it has a floor area of slightly more than two hundred fifty square feet, is about fifteen feet four inches wide and twenty-six feet long.

A Wingfoot Home will comfortably accommodate four people since it provides two bedrooms, a bathroom and a combination kitchen-living room. Included in this house are such items as an ice box, a four-burner apartment range complete with insulated oven and broiler, automatic twenty gallon hot water heater, a unit heater, shower bath, lavatory and many other features usually included in a much larger house. All necessary wiring and plumbing is included and is all built in.

The Wingfoot Home is built to last. The "stressed skin" plywood principle is used in the house. There is complete insulation in the roof, walls, and floors, which makes the Wingfoot product suitable to varying types of climate.

The roof on the Wingfoot is slightly pitched, made

of three-eighths inch, 3-ply plywood, and is capable of withstanding a roof load of more than forty pounds per square foot. The exterior walls are made of Tempered Masonite, a product which the writer can vouch for. It is a hard material which cannot crack like plywood. The interior walls are plywood. The house is completely painted inside and out when delivered. Several coats are applied at the factory, but the final coat is put on when delivered to suit the customer.

The house can either be put on a foundation or on building blocks. After delivery all that is required is the connection of the house to utilities.

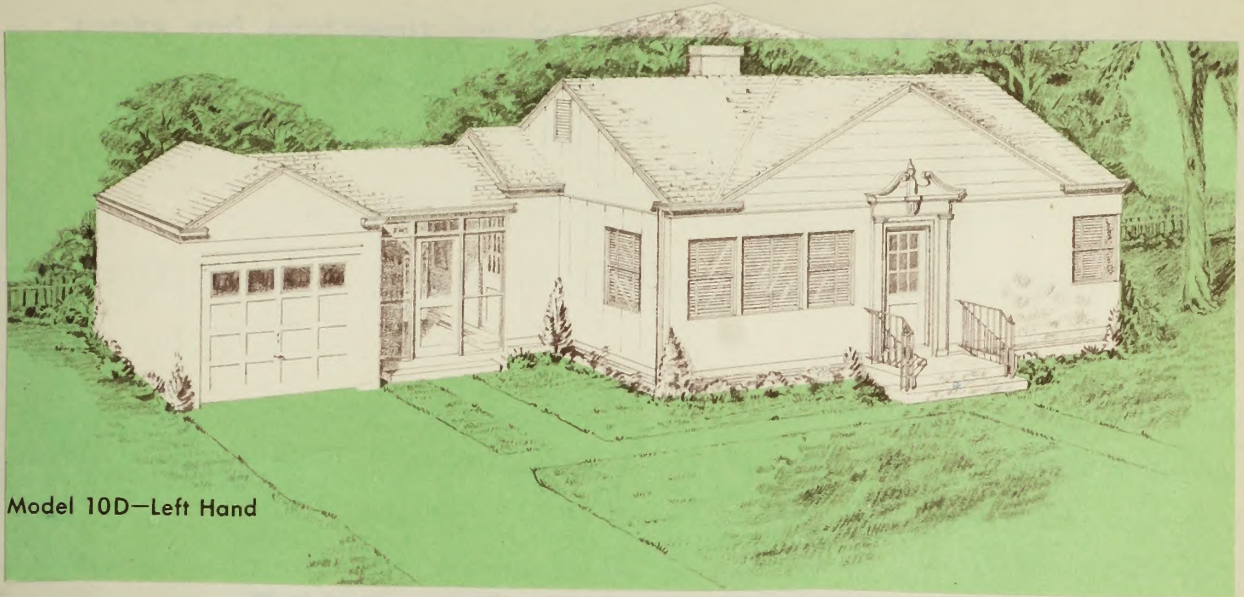
This home, as was stated at the start, is different. It can be owned by the purchaser, yet he can rent the land. It is a unique house in that it is not attached to the land as are other houses. Certain types of people will find this home to fit their requirements because of its easy portability. It is different, and it will be interesting to observe how the public accepts it.

THE BUTLER MANUFACTURING COMPANY (1)

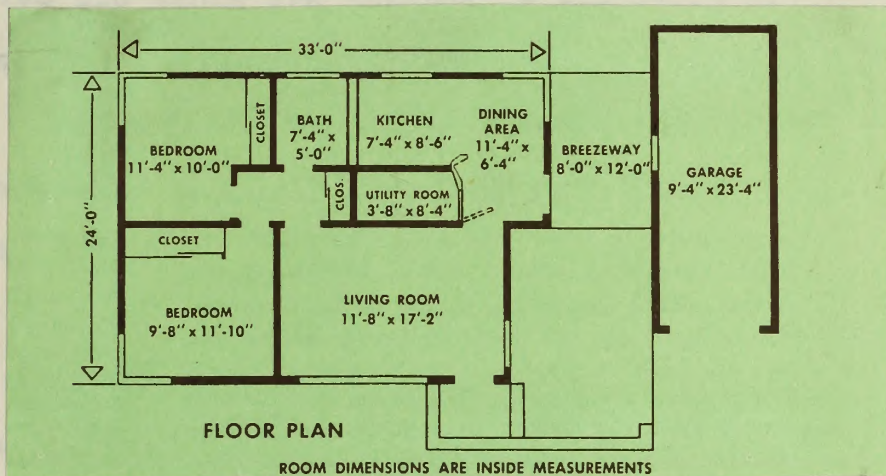
The Butler Manufacturing Company is one of Kansas City's large industries and their interests are in a variety of items including dry cleaning equipment, oil field

(1) Information supplied by the Butler Manufacturing Company

BUTLER MANUFACTURING COMPANY



Model 10D—Left Hand



tanks and equipment and many others. One of their divisions produce Boulevard Structures, which are aluminum filling stations and lunch stands.

The production of the filling stations was easily adapted to the production of housing and vice versa, using the same distribution organization and plant facilities. The company feels that it is protecting itself in case the house does not catch on too well. The house is called the "Boulevard House".

The house is made from panels which are made from aluminum sheets treated for paint adherence! Wall panels are formed with a four-inch flange for wall sections and with a four-inch flange for ceiling panels. All holes and slots are punched at the plant which gives uniformity and makes it easier to erect the house. Door frames are factory fabricated and door jambs notched. The doors are all fitted at the factory and the hardware is finished.

Exterior walls are aluminum, but it can be painted, or even stuccoed if desired. The interior walls can be aluminum, or they can have a wall board put on, and then they can be painted, or papered. The floor can be either galvanized steel panels or a two-inch concrete and then covered by any standard floor covering. The ceiling is formed by the use of four inch deep panels with the smooth surface forming the ceiling.

The roof can be either pitched or flat, as desired by the purchaser, and the exterior will show standard asphalt shingles, wood shingles or rolled roofing.

The Boulevard House is completely insulated in the walls, ceilings and floors with a hat or blanket type insulation. In addition, there is a reflective insulation in the aluminum wall surfaces.

The utilities will be provided by the erecting contractor to the purchaser's desire. Such packaged units as a garage and breezeway are available.

The two bedroom model is twenty-four by thirty-three feet. The windows (about 25% of the exterior walls) are all aluminum. Both the bedroom and dining area have corner windows, which seem to be popular. For closet space there is an eight foot wide closet in each bedroom and the doors are sliding panel doors. In the hall is an additional four foot closet.

The Butler Home meets or exceeds all Federal Housing Administration requirements which is vital in the financing of the house.

The house is very simply and easily erected. The panels are secured by very clever keys which are fastened by merely turning them in the already punched slots with an ordinary claw hammer. The first house was erected in nineteen working days, but Mr. Wilbur B. Larkin, manager of the

Housing Division, feels that this time can be lowered to two weeks when crews get more experience. (1)

The company believes the house can be put up for about \$7000, excluding the lot. A very excellent feature of the Butler house is that enlargement is easily possible by adding more panels, even after the house has been in use for years.

It is felt by many people that this house has the best chance of all the aluminum houses, of obtaining consumer acceptance because of its conventional appearance, both inside and outside.

GENERAL PANEL CORPORATION (2)

A type of prefabrication company which deserves mention is the concern which does absolutely no production but merely licenses its processes to others. There are quite a few who are operating this way today, or intend to in the future. Such a company is General Panel Corporation.

The System employed by General Panel was developed by two men of very wide experience in prefabrication, Konrad Wachsman of New York City and Professor Walter Gropius, chairman of the Department of Architecture of the School of Design at Harvard University. (3) Konrad Wachsman was the

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- (1) "Rigid Metal Tooled to Fit Flexible Design" Christian Science Monitor, October 28, 1946
 - (2) Bemis Foundation
 - (3) "Prefabricated Panels for Packaged Buildings" Architectural Record April 1943

chief designer of one of Europe's largest prefab companies. He also published "Holzhausbau" one of the most comprehensive analyses of wood construction ever written. As early as 1910 Dr. Gropius was experimenting with prefabs in Germany.

The floor panels are a stressed skin plywood, with two by three joists, either ten foot or six foot eight inches in length and eight or ten feet off center, incorporated in panels. Walls and partitions are stressed skin construction with the two by three framing members around the edges. The exterior surface will be plywood with no other covering than painting. The interior surface will also be plywood, which of course, can be papered if so desired. Filler strips fit into the joints and close them so closely that they are hardly noticeable. The panels are eight feet high and three feet four inches wide in walls and partitions and contain prehung doors and windows. For insulation "Cell-U-Foam", a masonite product is used.

Ceilings are not of the stressed skin construction as they have plywood only on one side. Roofs are usually flat, or can have a slight pitch. If they are pitched, they are supported by prefabricated truss assemblies. The roof panels are of stressed skin construction.

Utility installation is mostly conventional and will be installed at the site. Electrical connections are made by attaching a main line in the field to sub-assemblies which are shop-installed in the wall panels. BX is inserted

in a hole in the floor panel to join with the main line when the wall panel is erected.

Closets and cabinets will all be made at the shop, delivered to the site flat, and will be erected at the site by bolting them together.

Present production will be a few basic models, all low-cost homes which shall sell complete for about \$4600. The system has several outstanding features. The panels are connected by a clip and wedge assembly and only hammers are required to erect the house. To disassemble, the only tool required is a pair of pliers which makes the house easily expandable by adding panels.

This system can be used for almost any type of building, or any design. It can be used for two story structures such as barracks, or hospitals, as well as for houses. The panels are very versatile. (1)

The first organization licensed to use the system described above is the General Panel Corporation of California. This company has a tie-in with the Celotex Corporation and their products will be marketed through Celotex. At present the houses will only be sold for group erections but when in the future, they produce only panels, and not complete houses, the panels might be sold through lumber dealers.

(1) "Prefabricated Panels for Packaged Buildings" Architectural Record April 1943

It will only take a crew of four to six men about forty-two hours to erect a house. The first house will go up slowly because of the inexperienced crew, but after that the crew should be able to do it in about forty-two hours.

VACUUM CONCRETE COMPANY

In this chapter the writer has attempted to show examples of the principle types of prefabrication systems. The chapter would not be complete without mentioning the concrete house. Although there are concrete houses, there are no companies which produce them in the accepted manner of a company manufacturing a house.

The equipment involved in making concrete houses is very bulky, and very expensive. Also, it would be economically unsound to transport concrete houses because of their bulk. The result has been the evolution of a type of systems which concrete is designed to fit the unique problems of the particular product.

There are certain companies that have leased the equipment necessary to build concrete houses, plus the "know how" to build the house which fits the equipment leased. Because of the great expense involved, it is considered worthwhile only to build concrete houses in large groups. The Vacuum Concrete Company (the company whose process will be described here) suggests one hundred homes as the minimum for a project.

VACUUM CONCRETE PROCESS

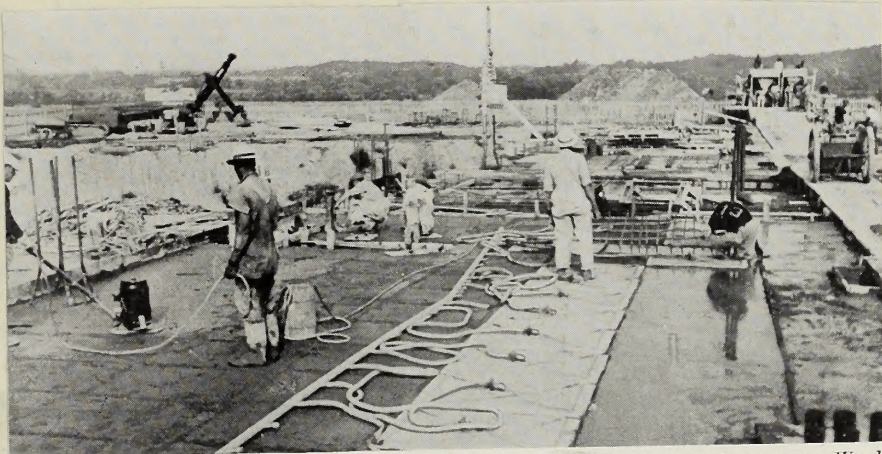


Fig. 1—Typical VACUUM CONCRETE operation, D. C. National Guard Armory, Washington, D. C. Power float is following immediately behind VACUUM suction mats on 12" floor slab, Chas. H. Tompkins Co., Washington, D. C., Contractors.

The Vacuum Concrete Company is headed by Mr. K. P. Billner, president of the company and inventor of the vacuum process.

This method of building with concrete was first shown by Mr. Billner to a group of scientists and engineers at Yale University about ten years ago. (1) The principle of Vacuum Concrete is based on the cement-water ratio law, that is, the less water in the concrete the stronger it gets. Billner demonstrated that by covering poured concrete with a mat and sucking out the air and excess water, atmospheric pressure compacts the slab and a quicker setting, stronger, denser and more uniform structure is made. (2) This strength increase is relatively much higher, or about 100% during the first days and this is important because it means much earlier removal of the forms. It is possible to walk on such concrete twenty minutes after pouring without leaving foot prints.

This new method of using concrete has been applied to house building by the Vacuum Concrete Company. They themselves do not build the houses, but lease the equipment and technique to contractors. The design for

(1) "Lecture on Vacuum Concrete and Electric Prestressing" Billner, K. P.

(2) Industrial Bulletin March 1937

the house is not at all standard and is worked out completely by the builder. There are several large projects under way using their machinery and process. An Orange, New Jersey builder, Leon G. Arpin, is building two hundred houses twenty-six by thirty-six and plans future projects with larger houses.

A description of the use of vacuum concrete in building a typical house follows. (1)

Concrete foundations are cast in vacuum forms which may be released and used over again on another set of foundations within a half hour after the concrete is poured.

The first floor is cast on a concrete mould and processed. The entire floor can be lifted up the following morning and set in position on the foundations. The top surface is to be covered by asphalt tile on some other covering.

To make the walls, a canvass is spread on the first floor and angle irons laid out on the canvass. These angle irons define the outline of the wall. Angle irons can also be used to define the outline of the doors and windows, or they can be put in place and cemented in. The angle irons are held in the floor by a vacuum. A light fluffy Vermin-lite Concrete is poured on the canvass to a thickness of two and one half inches. Vacuum mats are placed on the mixture

and it becomes consolidated within a few minutes. Then ordinary concrete is poured on the Verminlite to a thickness of two and one half inches. A slight amount of reinforcing steel is embedded in the concrete. Then the top surface of the concrete can be troweled with color pigment or a layer of about one fourth thickness of white cement paint can be trowelled onto the concrete. There is then a wall five inches thick. The strength of vacuum concrete is about three thousand pounds per square inch in sixteen hours. Therefore, if the wall is done even in the late afternoon, it can be put in place in the morning. The canvass is then ripped off, revealing a surface smooth enough for papering or painting.

The roof is cast the same way as the floor and lifted into position. If a peaked roof is desired, this can be accomplished by the use of light weight concrete trusses.

The partitions can be cast of light weight concrete on the concrete floor of the building and can then be lifted into position and joined to the walls by means of grooves in the walls where the partitions fit in.

Concrete homes may seem very unusual to New Englanders, but they are an old story in certain regions, such as Florida. However, even in New England there is a company, The Tech Processing Company. There will always be some

concrete house construction, although, in the writer's opinion, this isn't the answer to the low-cost housing problem.

There has been presented examples of all of the major systems of prefab in use today. These companies are representative and typical of hundreds of others who must, individually and collectively, meet the needs and solve the problems presented in the following pages.

CHAPTER III

CONSUMER ACCEPTANCE

NEED

Any business to be successful must satisfy some economic need, for the people, whether it be goods or services. Will the public accept the prefabricated houses? Of all the questions confronting the industry, this is the biggest.

Is there a need for prefabricated houses? "Prefabrication" is just a method of putting the house together, for the net result is the same--it is still a house. One does not say "is it a hand made suit, or is it a custom made car", it is referred to as a suit or a car. And so, too, with houses. If a need can be established for houses, that need includes houses of all varieties, regardless of how they are constructed. The following paragraphs will be devoted to showing a need for houses.

That there is a housing shortage today is an accepted fact by most Americans. The extent of this shortage and the seriousness of it will be shown. Many people believe that the housing shortage is a "war baby", but nothing could be farther from the truth. To be sure, the war has brought the shortage to an acute head, but it is only the culmination of over a decade of depression, with its subsequent building slump, and five years of defense and war.

What was the situation that existed in 1940 before

we were embroiled in the world conflict? At that time in the United States there were seventeen and one tenth million non-farm houses (1) which included one and eight tenth million whose condition was unknown, and ten and seven tenths million houses in various stages of usefulness from fairly good houses which lacked toilets and sinks (no running water) to filthy, rat infested hovels where men and women live under conditions which are a rebuke to the richest land in the world. That was the condition in the cities and towns in 1940 according to the United States census. The census also shows that the proportion of poor houses was much greater in the rural areas.

At this point the social results cannot be gone into but they definitely must be thought about. There is no exact knowledge in the results of poor housing, but there are wide areas of agreement. Authorities agree that improper ventilation, dampness and overcrowding, lack of sunlight and lack of sanitary facilities are very injurious to the health. Congestion drives children into the streets and the streets lead to delinquency.

It is interesting to note the results of a survey made by the United States Public Health Department. (2)

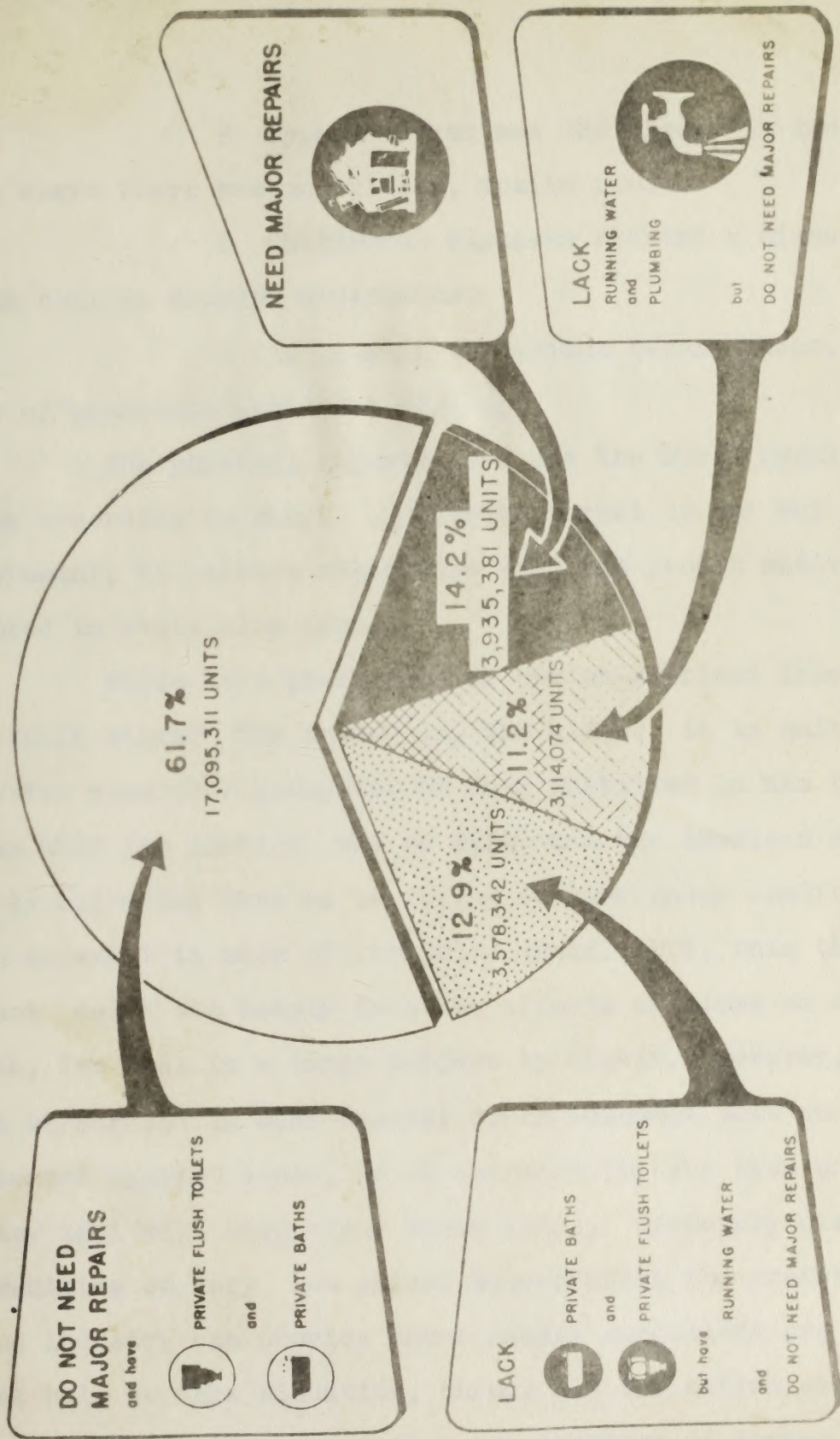
A Tuberculosis was measurably higher in crowded homes.

(1) Census, 1940
(2) Public Health Service "National Health Survey" 1935-6

Quality of Existing Housing

NONFARM DWELLING UNITS CLASSIFIED ACCORDING TO
STATE OF REPAIR AND SANITARY FACILITIES, 1940

<27,723,008 UNITS REPORTING>



B Typhoid fever was 73% higher in dwellings where there was no private, inside flush.

C Childhood diseases exacted a higher death toll in crowded households.

D As housing conditions became worse, the rate of household accidents went up.

The physical injuries are not the worst result of slums according to many. A definite threat to our way of government, to private enterprise with the profit motive, is bred in every slum area.

Where do a great deal of our un-American friends get their start? The answer is, the slums. It is quite easy for some poor youngster to have instilled in him the ideas that the American way of life, and the American system is all wrong when he is forced to live under conditions such as exist in many of our urban areas. But, this thesis cannot delve too deeply into the affects of slums on our youth, for that is a large subject by itself. However, it must be carried in mind because every argument that can be presented against slums, is an argument for any type of industry that will help clear these slums. Certainly clean communities of very low priced houses which the prefabricated industry can provide under normal conditions are a great help to this situation, though not the entire answer.

As further proof that the shortage of houses is not a war-borne one, look at house production figures in the building industry. Average production in the 1920's

had been 703,000 units per year, which shrank to a low of 93,000 in 1933. (1) Certainly, if 703,000 units was providing adequate housing for Americans each year, 93,000 units could not do the same, and the result was a serious shortage.

In 1940 in New York alone there were two million people living in dwellings which had been condemned as unfit for human habitation in 1885. (2) The Temporary National Economy Committee said in 1940 that in order to maintain national standards at the level at which they were at that time (4,000,000 units in the United States unfit for human habitation) 600,000 dwelling units must be constructed annually.

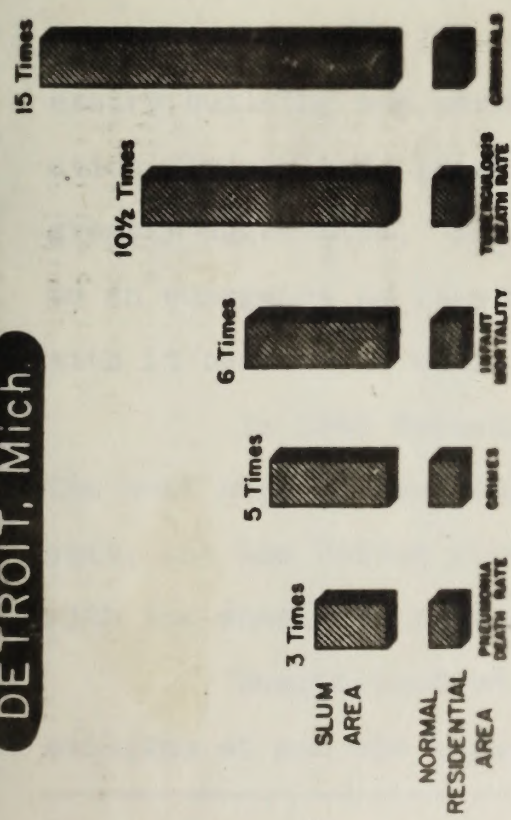
That is the situation that existed in 1940. According to the National Census one-third of all the dwellings in the United States, farm and non-farm, were sub-standard--that is, in need of repairs, no running water, or lacked a toilet or bath. (3)

Then came Pearl Harbor and the United States became one of the belligerent nations in the world's most disastrous war. Our American way of life changed, for every American had but one aim and object, to get the war over

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- (1) "Housing Facts" National Housing Administration, 1946
 - (2) Report by Temporary National Economy Committee, 1940, Prefabrication, April, 1946.
 - (3) Greer, Guy, "The Why of Planning"

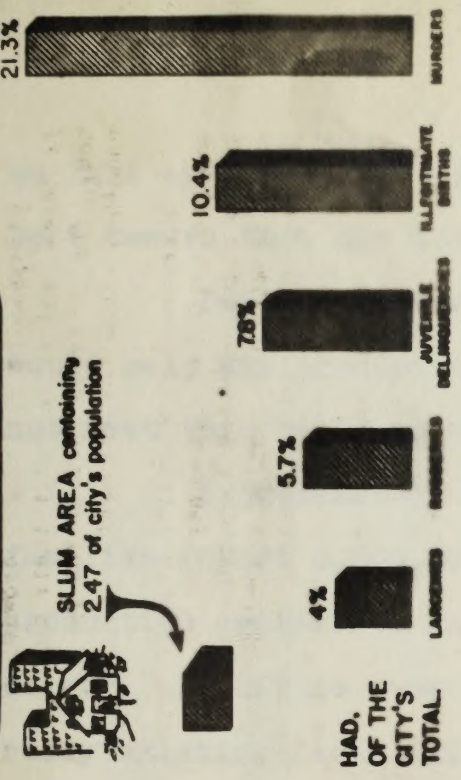
Social Aspects of Slum Areas

DETROIT, Mich.



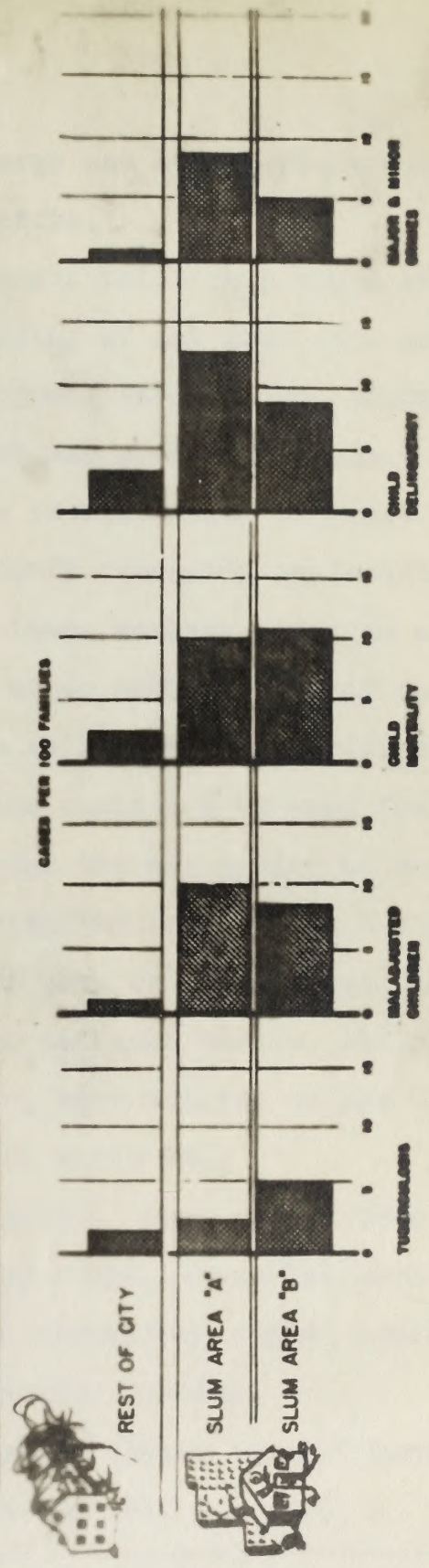
SOURCE: REPORT OF CITY OF DETROIT HOUSING COMMISSION

CLEVELAND, Ohio



SOURCE: R. B. DAVIS, "ANALYSIS OF A SLUM AREA"

MASON CITY, Iowa



SOURCE: IOWA STATE PLANNING BOARD (1930)

as fast as possible. Every energy and every effort was bent toward that one lofty objective.

During the war housing was built only where it would help war production. Building of any kind that could not meet this rigid test was stopped, and none was started.

Approximately 4,000,000 war workers and their families (about 9,000,000 people in all) moved to great war production centers to man the plants producing implements of war. A little over half of these workers lived in already existing facilities. The other half was housed in all sorts of temporary quarters such as dormitories, trailers, and other types of dwellings which could not be used for permanent housing. (1) All through the war period no unnecessary building was permitted, with the result that a situation already bad, because of ten poor building years, was greatly aggravated. However, the American people, rising to an emergency as they ~~ways~~ always do, were willing to put up with it because it would hurry the war's end.

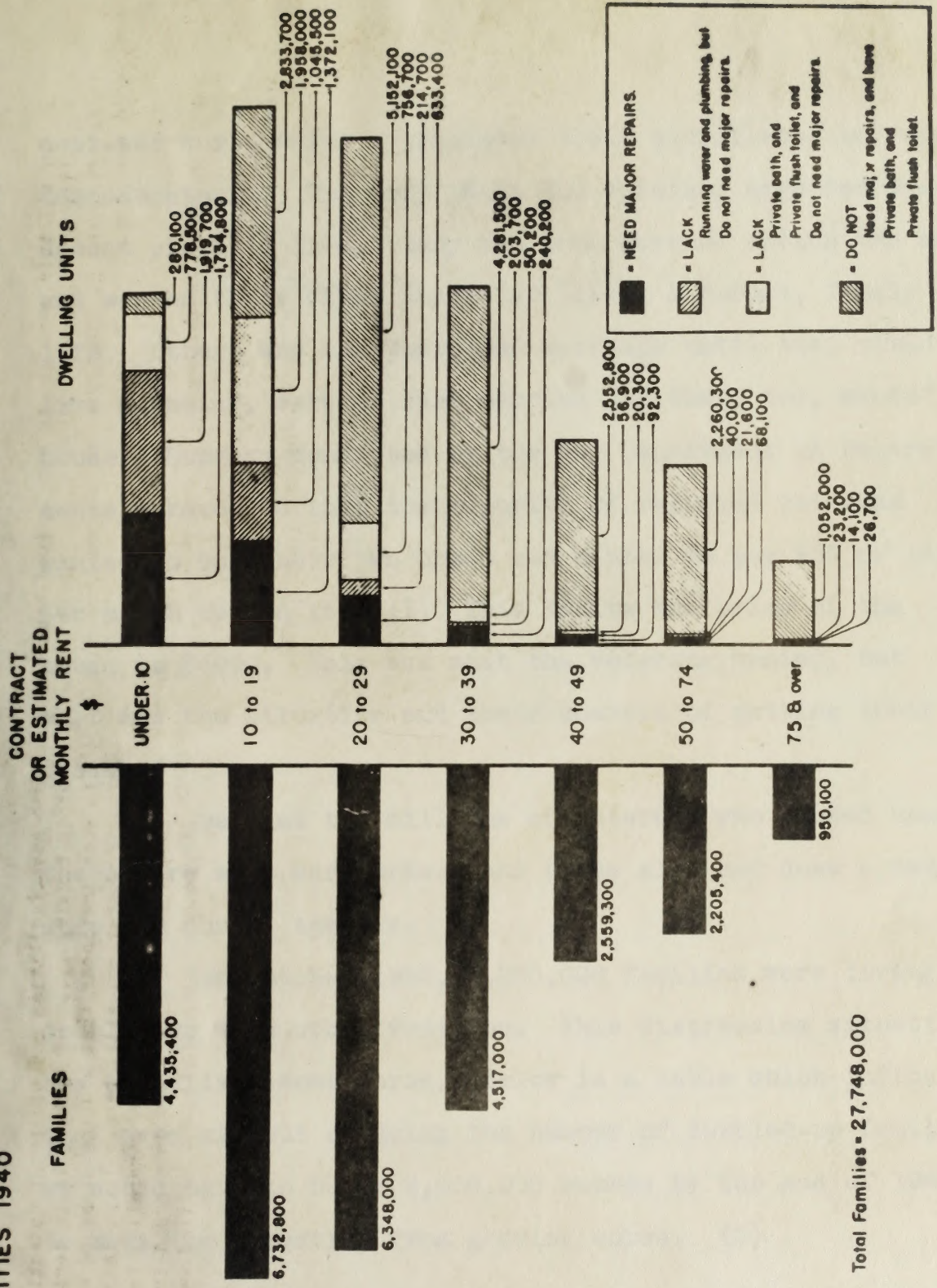
In 1945 Germany capitulated. Much sooner than the most hopeful ever thought they would, Japan followed suit, and the United States found themselves out of a war with the wheels of reconversion hardly turning.

Demobilization of the Armed forces brought home millions of men who expected, and had been promised, a

(1) "Housing Facts" National Housing Administration

Rent and Quality of Existing Housing

NONFARM DWELLING UNITS CLASSIFIED ACCORDING TO RENT AND STATE OF REPAIR AND SANITARY FACILITIES 1940



SOURCE U S Census, 1940, Population and Housing, Families, Income and Rent.

post-war world which appreciated their sacrifices, and would demonstrate it. The very least the veterans expected was a decent place to live. Many had been married during the war and wanted their first chance at living a normal, family life. Others who had postponed marriage until they could live normally, were at last married and they, too, wanted a house. Surveys conducted by the War Department at Separation centers revealed that the majority of returned veterans wanted to buy their own homes and wanted to pay \$50 or less per month to own it. (1) This limits the price of the house to \$6000. This was what the veterans wanted, but what was the situation and their chances of getting their desires?

Besides the millions of veterans who wanted homes, there were many war workers and these also had done a remarkable job during the war.

In October 1945, 1,200,000 families were living doubled up with other families. This distressing situation has steadily become worse. Below is a table which indicates that even without reducing the number of doubled-up families we would have to build 3,000,000 houses by the end of 1947 to keep the situation from growing worse. (2)

(1) Cummings, J. E., "Prefab Homes" Magazine of Wall St.

(2) Wyatt, Wilson, "Report to the President" 1946

Families living doubled up with other families, Oct. 1945 -- at least	1,200,000
Plus married veterans needing houses, Dec. 1946	2,900,000
Nonveterans married, needing homes Dec. 1946	560,000
	<hr/> 3,460,000

Less:

Existing vacancies and new vacancies occurring during 1946 as a result of deaths and dissolution of families	945,000
Additional families needing homes December 31, 1946	2,515,000
Additional families will need homes by end of 1947	680,000
Total at end of 1947 (with at least 1,200,000 families still doubled up (1))	<hr/> 3,195,000

If one studies the above figures the full seriousness of the housing situation becomes apparent. The greatest concern today should be for the veteran because the country owes him a debt of gratitude for what he has done and what he has been through. A disillusioned veteran can fall easy prey to subversive propaganda and defeatism. If we are to maintain America as a land where there is freedom from persecution, where no man will be persecuted because of race, creed or color, we must have a country full of young people who have faith in its future. The veteran,

(1) Wyatt, Wilson, "Report to President" 1946

while he was away, painted to himself a pretty picture of what things would be like when he returned. He returned to find many changes and to taste many bitter disillusionments, but probably the worst of all were found in the housing situation.

The appalling conditions under which many veterans are forced to live is small compensation from the richest land in the world, to its men who fought and bled for it. The problem of veteran housing represents the emergency housing problem of the immediate future. To fill this requirement Mr. Wyatt, former National Housing Expediter, said it would be necessary to start work on 2,700,000 by the end of 1947. (1)

To do this, Mr. Wyatt planned on 850,000 premanent prefabricated homes. (2) Mr. Wyatt recognized that if the veteran emergency was to be met, the housing industry would need a shot in the arm. The program of Mr. Wyatt, and what happened to it will be discussed later.

As was stated before, the housing shortage is not one created by the exigencies of war alone, and by the same token it is not one that will have been solved when the immediate emergency is met. To be sure, the emergency of getting houses is a great responsibility of the entire

(1) Wyatt, Wilson, "Report to the President"
(2) Ibid.

country, but in the final analysis, the veterans are citizens, too, and the long range need, while not as colorful sounding, is the more vital to the national economy.

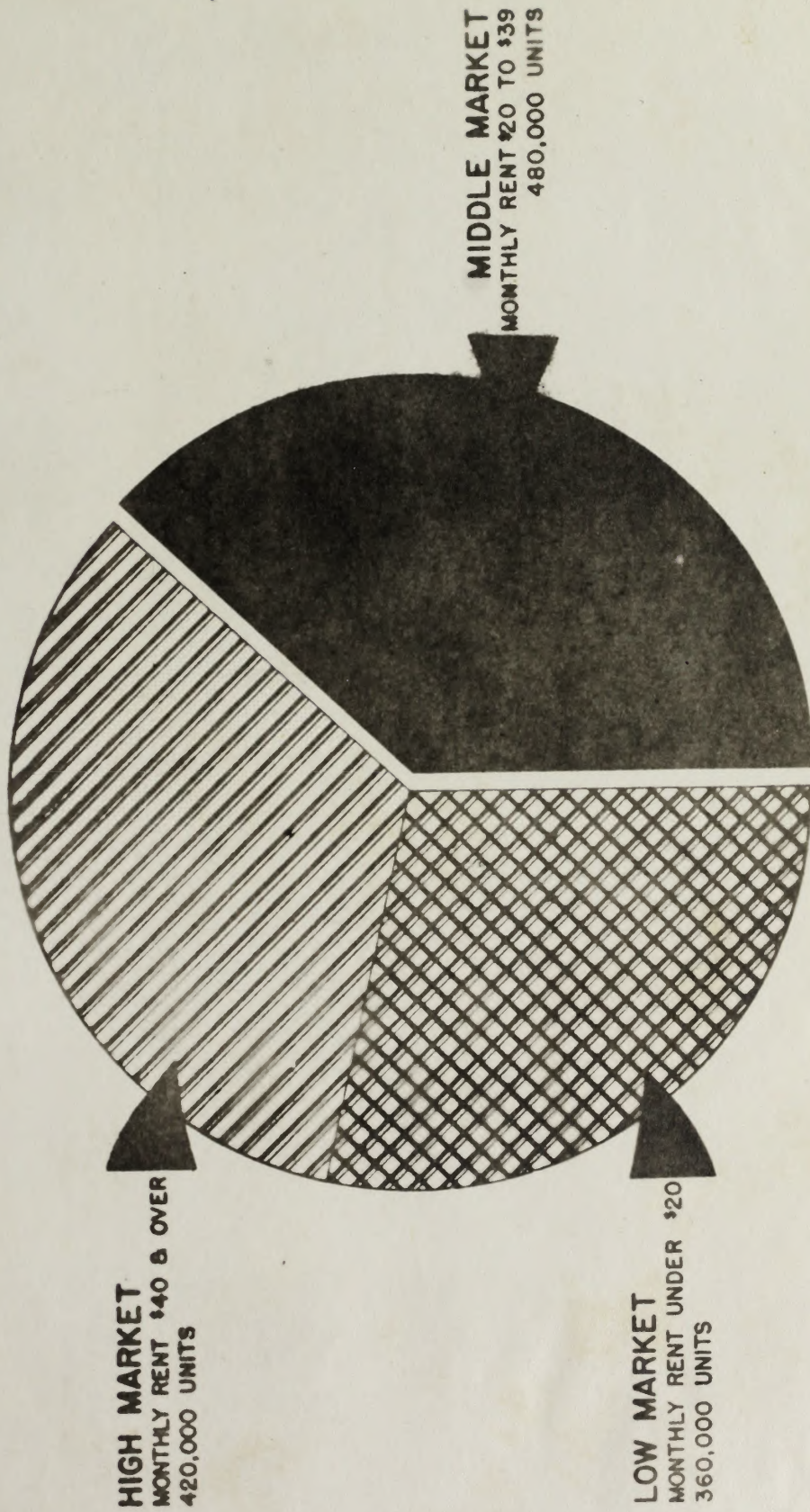
It is felt by many that this country might not be able to weather another great depression. There is a large segment of legislators and economists who blame the residential construction instability for the last depression. (1) A stabilized housing industry is something that conventional builders have never been able to give this country, and it has been injurious to the national economy.

Fluctuations in residential construction were far more extreme and far more severe than those in industrial production. In the twenty year period from 1920-1939, the first ten years of the period showed the average index of industrial production was 45% lower than the average index of residential construction, while the second ten-year period showed the average index of residential construction was only 45% of the average index of the industrial production. (2) Many people feel that if residential construction had not taken the severe dip which it did starting in 1925, but had been checked and levelled off, the great industrial depression which started in 1929 might have been less severe and of much shorter duration.

(1) "Housing Facts" National Housing Agency, 1946

(2) National Bureau of Economic Research, Bureau of Labor Statistics.

NONFARM DWELLING UNITS NEEDED ANNUALLY CLASSIFIED BY MARKET LEVEL — 1940 PRICES



It is the opinion of the writer that an industrialized housing industry, working with the tools of all other large industries--such as economic planning on a large scale--not just many small individual contractors, building as they see fit, will do much to stabilize residential construction. It is this dispirited element of the building industry as it exists today cropping up all the time. There are so many small, individual operators in this business that stabilization is virtually impossible.

Most builders on a small scale are, in reality, carpenters. A building material firm is forced to extend these people credit in order to get their business. If the builder loses money on the job, as he often does, the dealer might go unpaid, or end up with unwieldy real estate liens. But if this procedure produces a loss, it must be absorbed by other customers who can afford to pay, with the consequent rise in prices for building materials which in turn necessitates a rise in the cost of building. Such practices may become a vicious circle, one that the writer feels will not be solved unless the residential construction industry evolves as a large scale, mass production industry similar to the automobile industry.

SUMMARY OF NEED

It has been shown briefly that housing as it exists today is inadequate. Veterans are in dire need of houses as are millions who did not serve in the armed forces. Much

of the housing now in use is in poor condition and should be repaired, or still better, replaced. Poor housing becomes slums, and slums breed ill health, delinquents, and dissatisfaction with our country.

The instability of residential construction is believed by many to be one of the causes of severe depression. Even in peace, the conventional building industry could not stabilize itself, which leads one to assume that something new should be tried. One strong recommendation would be to convert housing to a large scale, mass production industry similar to the automobile industry.

CONSUMER ACCEPTANCE

As has been stated, the big question to be solved by the industry, is the winning of consumer acceptance. The prefabrication industry is really faced with three big drawbacks. First, the building codes in many urban areas are unfavorable to prefabricated houses. Second, the building trades unions are openly opposed to the development of this new industry. These two obstacles will be dealt with in the next chapter. The Third obstacle and perhaps the greatest from the point of view of retarding development and difficult to overcome, is the problem of consumer acceptance.

To the writer that is a glaring inconsistency. Here, in America, the very home of great, large mass-production industries, where industrial tycoons are awarded the place in society that other countries reserve for royalty, we refuse to permit the industrialization of one of our necessities of life, namely shelter. If there were a clamour from the public for low cost mass produced houses the other obstacles would melt before it.

We Americans who accept standardization in almost every phase of our lives, refuse to allow it to give us the low cost but higher quality houses that it could. We have standardization in our clothes, our transportation, all the

wonderful modern home utilities like vacuum cleaners and home laundries are ours because we are willing to accept standardization. Americans must be made to recognize the fact that their housing industry is far behind the rest of the industrial progress of America. Today homes are being built in a manner similar to that used by our early ancestors, in this country. In a modern world of atom bombs, rockets and airplanes that can carry 750 people, a house is still built almost entirely by hand, with many of the same materials used by our Forefathers.

In pioneer days, and even up until World War I, there was some excuse for using some of these Archaic methods. Labor was cheap, and life more leisurely, but that is not the case today. Labor costs have risen to heights which are probably permanent. No longer will men toil from "'caint to 'caint", for hardly enough to live on. (1) Today a man works, in most places, forty hours a week, which is only eight hours per day, five days a week, at regular pay. For all over time a worker receives time and a half, or double time. The result is obvious, labor costs have increased so that in order to maintain a reasonable price for most products, productivity per man hour must be increased. Since man is still man, and has not changed physically to the extent where he can do two or three hours work in one, the obvious answer to maintaining the price line

(1) An expression used in the South to say that men work from when they can't see in the morning 'til they can't see at night.

or even lowering it, is improved technology.

Every large sized industry has improved greatly in its technical aspects (1) with one glaring exception, the residential construction industry. The result is that in the past years, discounting the recent war years, technological advances and mass production had succeeded in bringing the price on many items heretofore considered luxuries, down to where the worker could afford to own them. Almost every middle class family has a car, a telephone, several changes of clothes, several pairs of shoes, but few own their own homes. The figures for the Boston area are given below to show the percentage of people owning homes, as against those owning automobiles. The area surveyed includes 40 cities and towns within a 15-mile radius of Boston City Hall. In the area there were 165,744 people who owned their own homes, yet 366,303 owned their own cars. If the American people not only would accept , but would clamor for a mass-produced home, this every day necessity, shelter, also might one day be owned by nearly every person who might own a car or have a telephone.

What is the industry doing about trying to win acceptance for their product? Some of the leading companies are making a concerted effort, but the writer is sorry to report that not enough of them are putting their energies toward this objective. Too many concerns are willing to sit

(1) See chapter on Criticism of Construction Industry

back and hay-ride in on the crest of the greatest housing shortage in our history. Companies that are doing a remarkable job of cracking codes and winning over labor unions have done little to educate the public. The writer feels that if the industry does not fulfill the promise that its champions hold for it, that it will be because of failure to win public acceptance.

The position of the American consumer's acceptance of prefabrication is important as a starting point to see just what must be done in the field of winning friends among these consumers. This position is clearly shown in a survey conducted by Fortune magazine and printed in its April 1946 issue. (1)

Approximately 70% of the people have heard of prefabrication but only 50% knew that they were and only 16% would care to live in them. The editors of Fortune would care to live in them. The editors of Fortune state (and the writer heartily concurs) that a public relations program is in order here. When only one out of every two people know what prefabrication is, the industry certainly can see that it has a vast job ahead in public education. People won't just invest money in something until they know something about it.

Thirty three per cent reported that they would live in a prefab only if they could get nothing else, and

(1) Fortune, April, 1946

these were asked:

What don't you like about prefabricated houses?

RESULTS:

	Based on those answered	based on sample total
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Unsatisfactory Construction

	67.4%	22.2%
Lack individuality	13.4%	4.4%
Too small	4.6%	1.5%
All other	18.4%	6.1%
Don't know	9.6%	3.2%

Some people gave more than one answer to this question.

The first category includes statements like: "Not substantial enough, not strong enough, not permanent, not warm enough".

An analysis of this survey will reveal the obvious conclusion that the public is not well informed enough on prefabrication. The criticism of the biggest group was "unsatisfactory construction". That may have been valid for some prefabricators, but this is also an objection to some conventionally built homes. The writer recently visited a prefabricated house constructed at the factory of E. F. Hodgson Company which has been standing a number of year, and it seemed to be as liveable as the day it was erected. One factor which impressed the writer was that its appearance was quite similar to the traditional Cape Cod house from which the average person would not be able to tell the difference. This seemed to demonstrate that conventional lines could be produced under the factory method.

Consumer resistance to prefabrication has been developing through the years, and one can see the reason: A look at some of the early prefabricated houses will give some

clues.. (1) When the prefabricated industry first started to emerge, the pioneers were mostly architects and people with deep feeling that the housing industry should be completely revolutionized to give the masses a chance to own a home. They might be referred to as people with a great social consciousness. They realized that there existed here, as well as in the rest of the world, a great inconsistency. Man-hour productivity had increased as much as 500% in some industries while in the building industry it had remained nearly the same. (2) These pioneers realized further that to bring the benefits of the Twentieth century industry and science into the housing industry a revolution in the types of houses Americans would live in would have to take place.

Americans for centuries had been living in homes similar in style to the early American houses. Early American dwellings were fabricated from the materials hauled from nearby forests, on the site. With the attitude that "if it was good enough for their father's, it was good enough for them" they continued to live in the same style of house, built in the same manner. Instead of hauling the material from the woods, it was taken from many local dealers, who in turn had taken it from many regional wholesalers, who had

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- (1) Mudge, J. H. "Tomorrow's Houses"
 - (2) Reed, Wm. V. Director Standard Division of Prefabricated Housing, September 1941

taken it from manufacturers--each getting his profit and increasing the cost of the house. The net result was that while we were living in houses similar to those of our fathers, they were costing much more, to the extent that it became a luxury to own one, frequently taking a quarter of a century or more to pay for it.

These prefabricated pioneers realizing that this situation should be changed, wanted to manufacture houses in factories in a manner similar to cars and refrigerators. After experimentation they discovered that houses best suited for mass production were of a different type from the traditional American home. Being men of science mostly, and not public relations men, or even business men, they plunged ahead and received a great deal of publicity, much of it unfavorable, for the flat-roofed, very angular models which they had developed.

Since these men were working for improvements in low cost housing, they attempted to produce a desirable home at a very low price. The movement was given much fanfare in the popular picture magazines and rotogravures with the result that persons who might have been interested were turned against prefabrication of homes. Instead of comparing it with the shack of the share cropper, or the roach-infested slum dwelling, they immediately damned the whole prefabrication movement because the houses were cheap, angular looking, and outwardly not substantial.

The movement was hurt severely by this adverse reaction of the public to prefabrication, with the result that the industry was unpopular for years. The war produced the result that Americans needed places to live, and needed them in a hurry. The prefabricators were called upon and provided much admirable housing. Profits from these ventures gave many companies the money to assault the civilian market once again in the post war era.

Today in the post war era the prefabricators are offering a more modern solution to the complex housing shortage, and are also hoping to establish themselves as a great industry. The leaders in the industry realize now some of their mistakes and they intend to correct them this time, for if they fail again, the industry might not survive. Writers on the subject realized that one of the greatest problems was the bad name the industry had earned.(1) The leaders realized quite well that the people would not accept a revolutionary house and they were aware that if factory built houses were to become popular they would have to look more like the traditional American house. The savings that might occur from producing such a house might be less than for one that was designed for prefabrication. While it was not an ideal situation such as the fathers of the industry had dreamed of, it was nevertheless a start. The process would have to be one of evolution rather than revolution, at least it would be one of slower growth.

At this point the prefab writers realized that the word "prefabrication" was one of the hardest things the industry had to overcome. (1) The whole problem of acceptance was involved here. The word "prefab" tended to recall to the public mind the little, angular looking houses of the early days of the industry. Many writers suggested changing the name but little has been done.

It is at this point we find the industry today. The producers realize that their defeat in the past was because they tried to go too fast with unorthodox styles and materials, and they intend not to make the same mistake the second time. As evidence that the harm has lingered, note the Fortune Survey referred to previously and see what the word "prefab" brought to the minds of too many people.

Here the writer would criticize the industry. Certainly it should be obvious to these men that their chief problem is that of winning over the public, yet they have as yet no organized campaign to do just this. Here and there a story or other publicity breaks into print about what is being done but most writing on the subject is done in such magazines as "Architectural Forum" and "Architectural Record". These magazines are not read by the man in the street, the man to whom, in the long run, the prefab industry must sell their products and the publicity is lost.

The industry must repeat and repeat to the people

(1) York, F. R. "The Modern House"

that prefabrication is just a method of putting the house together, that the result is often much the same, except the price is lower. An attack of this nature will help to convince the people of the savings without forcing them to change their ideas on what a house is in order to take advantage of these savings.

Some of the companies are doing a good selling job, and some of them are wise in their methods of operation. It is the opinion of many leaders that if the industry is ever to succeed they must lay the groundwork now. As soon as hostilities ceased many of the companies could have marketed some kind of house, but it would not have been satisfactory. Instead they chose to bide their time until they could market a product which would be one to be proud of, one that would stand the tests of time and one that would win friends for the young industry. (1) Anchorage Homes, a firm that intends to cater to stolid New England, is of this opinion. As a result of this they have kept their product off of the market until they could put out a good one. They feel they will benefit in the long run (and the writer agrees with them) from such conservative policies.

Anchorage Homes, Inc. is typical of the new ideas of prefabricators. They realize they cannot change the people, so they have developed a product to satisfy the New Englanders they hope to serve. Their product is to be a line of forty-eight homes of Cape Cod design. (2)

(1) Bemis Foundation interview with Kelly, B.
(2) Anchorage Homes, Inc. "Your New Home"

Many architects and builders are quite convinced that basements are no longer necessary. However, in a survey conducted by Anchorage Homes in the area they intend to serve, (1) they discovered that the people would not accept a basementless house, even if it meant savings. Anchorage, with an eye to winning friends, has designed their houses to be built over cellars for the present, but in the future once they are established, they will try to break away from this form. Anchorage seems to have an enlightened point of view which should win customers and sell houses, in a region where the industry previously has failed.

Perhaps the company which has done most in the field of public relations to win consumer acceptance for its product is Gunnison Homes, of Albany, Indiana. To many people, Mr. Gunnisson is "Mr. Prefabricated" himself. He is one of the real leaders in the field today, and picked by many as one of the "big winners" in the prefab sweepstakes. They have a combination of production and selling policies that is hard to beat. Mr. Gunnison realizes that prefabrication is a selling job and that it has been retarded heretofore because the companies were run by many engineers and architects, who did not understand mass production for a mass market. In addition, his company, Gunnison Homes, is now a subsidiary of United States Steel, which will provide the capital to weather financial storms. A study of how

(1) Interview, Mr. King, Anchorage Sales Department.

Mr. Gunnisson operates would be a good course for any pre-fabricator entering the field hoping to be successful.

The head of Gunnisson Homes is an inspired merchandise man (1) with over-powering energy. He has long preached that neither the industry, nor any member in it will ever "amount to a damn" unless they apply the principles of mass production, mass distribution and mass sales. (2) He does not employ architects, but uses product design men on the ground that architects are individualists and cannot fit into his pattern, while product design men understand mass production. Even Mr. Gunnisson had to learn the hard way about selling ultra-modern designs to an unready public. He had a disastrous experience trying to "push" them in New York and now has given them up. He produces homes with his mythical "Minnie and Joe" in mind. "Minnie and Joe" are an average couple at whom he aims his sales programs. They earn between \$2000-\$5000 and Mr. Gunnisson himself lives among their counterparts in a community of his own houses. He always talks with his neighbors attempting to find things that will improve his hous. Gunnisson asserts that it is not his problem whether modern housing is better for Minnie and Joe. His desire is to sell houses, so he will give them what they want.

(1) "Where is Prefabrication" Fortune, April 1946
(2) Ibid.

Gunnison Houses will only go over as well as the men who sell them, and so as a big part of his public relations, and also for his sales training program, he has established "Gunnisson Homes Institute". (1)

This school, located in New Albany, Indiana, is headed by Dr. Lawrence G. Lindahl, B.S., M.A., Ph.D., an industrial psychologist. "The Institute was founded", says Dr. Lindahl, "For the purpose of training Gunnisson personnel and others in an effort to clear away the confusion of thinking on the subject of prefabrication and thus to facilitate its progress". (2)

The purpose of the school is educational as well as commercial, intending to educate people to sell the public on prefabrication. Almost anyone connected in any way with the field can be admitted to the four-day course if he is so inclined. During the summer, a special course is even given for business students who are interested in prefabrication. It is an institution which, you might say, preaches the gospel of prefabrication. If a few more could be established throughout the country by other prefabricators, it would do much to create good feeling for their houses.

At the school the men are given a thorough four-day indoctrination course on Gunnisson houses. The men have

(1) Colby, Lester, "Promotion of Packages Homes" Sales Management June 1, 1945

(2) Ibid.

pounded into them that the old method of home construction involves much time and expense--architects, builders, middlemen, sub-contractors--all must get their share. When the people realize this, and the industry should advertise the fact, they will understand that a house just as good, for less money, and with less trouble can be obtained, and the prefabrication demand will grow.

Most Americans today are "priced-out" of the housing market because costs in residential construction have increased over 100% in the past 5 years. This means that a 5-house that cost \$5000 pre-war, is now selling for at least \$10,000. The worker just cannot afford to pay such prices and is therefore priced out of the market. The bulk of the people make between \$25 and \$45 per week. An adequate house (1) must be built which will enable these men to have the pleasures of owning a home.

The Institute pounds into the men that mass production has proven that it will cut expenses, but there must be mass orders flowing from the dealers to the factory to keep production up. In the future the Institute will be the final training grounds for all Gunnisson dealers, so of course sales is stressed almost completely.

The students are taught that the women are the deciding factor in 95% of the cases, so their sales technique must be aimed at the female sex. They are taught to stress

(1) Colby, Lester, "Promotion of Package Homes" Sales Management, June 1, 1945

that conventional homes are built from a maze of blueprints in a slow, cumbersome way which only confuses women. Gunnison wants his men to sell homes like cars or refrigerators--- the finished product.

Fortune says that Gunnison combines "an adroit mixture of common sense and calculated blarney" to sell his houses. His whole sales technique is based on psychologically appealing to the people he is trying to sell. One of his little ruses to win friends is the "beer trick". If it is a hot summer day when a dealer is showing the house to a couple there is always the "beer trick" to win their confidence. The dealer immediately leads the way to show the refrigerator. He opens the door, and there on the top shelf are two cool glasses and two bottles of beer. On the second shelf is a very gooey dessert for the wife if she should not like the beer. (1) It is obvious that Gunnison himself is a super salesman, and he is trying to weave around him a network of super salesmen.

Mr. Gunnison's keenness on selling does not blind him to the importance of his product. He is well aware that in the final analysis if he is to be successful, it is his house that will get him there. He has spent much money to develop a house that will undersell anything a conventional builder will sell of similar quality. He is going to give the people their money's worth, but that will be done at the

(1) "Where is Prefabrication?" Fortune, April 1946

factory and he can hire men to do it. The big problem, he realizes, is getting men in the four corners of the country who are sold enough on prefabrication to do a good job selling them. It is for this reason that he has established the Institute and for this reason he will permit almost anyone to attend. He is trying to win people, who in turn will win other people over to prefabrication. He particularly invites builders, real estate men, and dealers to attend his school. These men are natural opponents of prefabrication and Mr. Gunnison realizes that if he can win them, others will be easy. Mr. Gunnison is certainly one of the leaders in prefabrication. While others may have done more to develop techniques of building the houses, or others have done more to develop new materials for prefabrication, few, if any are his equal when it comes to winning friends for the industry and winning consumer acceptance for prefabricated houses.

One of the biggest complaints leveled by most people against prefabrication is that of "standardization". People invariably interpret this to mean standardization in final, finished appearance. They assume that every house will look the same, and their individualistic spirit revolts against this.

The price of a prefabricated house might be brought a lower if every house was identical, but that is not the immediate plans of any of the prefabricators. They intend to standardize the parts, which can be done and still leave many optional items to the owners. Most companies build

their house in certain stand sized panels which can be erected in any one of a number of ways to give different effects. As was said previously, Anchorage is offering forty-eight different houses to choose from. Yet, this company is using only one size panel, which can be shifted, and more used, or less used, to make different shapes and sizes.

Mr. Gunnisson has a very convincing way of demonstrating how to overcome standardization. A lecturer at the Gunnison Homes Institute plays with blocks to show how the porches, breezeways, garages, wings and chimneys will take away that look of standardization from his houses. If this is not enough, variety can be obtained by shifting sidewalks, paint colors, shrubbery, entrances, shutters, window boxes and many other small things to make the house look different and distinctive.

Anchorage and Gunnison are not alone in their attempts to discredit the cry that "they all look alike", every company in the industry is doing it. Another example is Admiral Home, Inc., of West Newton, Pennsylvania.

At this time Admiral furnishes three basic houses of 4, 5, or 6 rooms. They manufacture panels which can be juggled to give many different affects. All plans can be varied in the placing of basement stairs, entrances, chimneys, and all the other possible arrangements described above for Gunnisson. In addition, however, Admiral offers a great variety in interior decoration.

Walls can be papered, painted or used as sent from the factory with a complete lacquered finish. The exterior finish can be used with the plywood exposed in any color paint, or covered with brick veneer or asbestos shingles. The homes can have full basement, utility basement, or no basement at all. By the use of Admiral panels fifty combinations of floor plans are available. (1)

Many more companies could be gone into, and their attempts to defeat the standardized look, explained, but the writer believes enough typical ideas have been cited to show the reader that the charge of "standardization" is not a warranted one to the extent that those who expound it would have you think.

One has only to visit any large, low-priced, conventionally built housing development to realize that in the low priced field, standardization has always existed. Few people who buy a \$5000-\$7000 house have anything to say about how it will be built. They are usually built by an operative builder who might build hundreds at a time from the same plans. Certainly this type of house is more guilty of standardization than the houses offered in many different combinations by the leading prefabricators.

"People will buy prefabs when they are convinced that they are getting more for their money. In fact, a--

(1) Information on Admiral Homes taken from personal letter from M.A. Perucca, Admiral Sales Department to the writer.

advertising, might make them preferred in the low-cost field because Americans tend to glamourize new products", so writes Mr. Robert Jones in Better Homes and Gardens. (1) Certainly the editors of this magazine would have a keen insight into what the people will and will not accept, and they are convinced that the prefab industry has a great chance to capture the low priced field of housing.

Mr. Ed Greene, a pioneer and leader in the pre-fab house industry has a different opinion on winning consumer acceptance than most of his contemporaries. Mr. Greene is president and founder of Green's Ready-built Houses, and is building a more expensive house, aimed at the people with more money to spend. (2) They base their hopes and sales on what they call "snob appeal". Mr. Green says that anything new that has come on the market was, in its infancy, aimed at the upper brackets. When refrigerators first were introduced, they were for the classes, he says, and as they were gradually accepted, they were produced for the masses. So it was with automobiles, he continues, recalling the Pierce Arrows and Rolls Royces that were the leaders in the car field in the early days. He intends to produce a house to sell for perhaps \$10,000 or \$15,000 but give the purchaser features which could otherwise be obtained only in a house selling for \$18,000-\$25,000.

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- (1) "Is there a Prefab in Your Future" Better Homes and Gardens, March 1947
 (2) Interview with Mr. Kelly of Bemis Foundation

It is a different point of view, but perhaps Mr. Greene has the right one. He says that after the richer people accept them, the people with less money will clamour for them. When that time comes, he will produce a low-priced house also. There might be something to Mr. Green's idea because all style goods are first introduced in the more exclusive shops, to be copied later by the department stores and later by the lower priced stores. This is the way with women's dresses and other consumer goods. (1)

People who have worked with and in the industry, are convinced that it will succeed, as are students of the movement. There is an economic need for the industry which eventually must win out. It is being retarded by old die-hards, the same type that refused to sell their horse and buggy in favor of a car, and now believe the airplane is a passing fancy. The tragic part is that many such people are in a position to mould public opinion, and instead of helping the young industry have done much to hinder it.

As was stated earlier in this chapter, the writer feels that the industry has fallen down in the field of public relations. The members of the industry are very alert to find what is disliked about their products, and quickly make the necessary changes. However, after they make the changes they keep it to themselves. The industry

(1) Brisio and Wingate, "Retail Store Management"

needs more men of the Foster Gunnisson type, men who have a good product and don't mind telling the world about it. More work must be done to educate the public to what the industry has to offer.

There is a Prefabricated Home Manufacturing Institute to which many of the companies belong. Many of the concerns contacted by the writer claimed that they were leaving public relations to the Prefabricated Home Manufacturing Institute which, sad to say, seems to be doing very little. Perhaps the Institute does much behind-the-scene work, but it is very difficult to discover what it is. In two attempts to get information from that office as to what the Institute was doing, the answer was the same, a "canned" booklet picturing a few houses.

It is felt by this writer that this Institute could be a very active winner of friends for the industry, which it is not at present. The concerns cannot depend solely on this organization, which seems to be asleep, to win public acceptance. If the industry is to amount to anything, it should both individually and collectively, attack this common problem.

Some companies make a practice of sending speakers into their region to deliver talks before groups. This is a good idea, but more of it should be done. The companies should not wait until they are asked, they should be aggressive and attempt to get speaking dates for their men. It is only

through taking advantage of every channel to inform the public, that people will be aware of what is available to them. The industry today has the opportunity to sell themselves under the most beneficial conditions because of the great demand for housing. They should not lose it by failing to act, or by failing to talk.

SUMMARY

It has been shown that there is a great need for housing in the low-priced field. Housing conditions in this country today are the worst in our history. A new industry is appearing over the horizon to help solve this problem, the prefabricated house industry.

There are many retarding elements the greatest of which is the problem of winning consumer acceptance. It has been proved that many of the charges hurled at the house such as "unstable, and standardized" are unfounded.

The problem then, is to educate the consumer. Mr. Foster Gunnisson, through his Gunnisson Homes Institute, is an example of what can be done. He has furnished the leadership, it is now up to other men in the industry to follow suit.

CHAPTER IV

A CRITICISM OF THE CONSTRUCTION INDUSTRY

A study of prefabrication would not be complete if the need for the industry was not shown clearly. One of the greatest reasons for making the new industrial house a "must" of the very near future is the traditional, conventional building industry itself. The industry, as it exists today, and as it has existed for centuries with little change, is keeping a great segment of the people from owning their own homes, because of excessive costs.

Much criticism has been leveled at the construction industry. Possibly some of it is unfair, but such loud and oft-repeated clamour must be based at least partly on truths.

The history of every industry is a long one, which goes back many thousands of years. Shoes were worn in some form since time immemorial. Cloth(textile industry) has a history almost as long as man himself. So, too, the history of shelter goes back to the days when cave men roamed the earth and dwelt in their caves. From very early days, each industry has changed very gradually with the passing time, until two hundred years ago, when the Industrial Revolution catapulted most of them ahead rapidly. Stimulated by improved scientific knowledge, and the application of new methods to group effort, the old methods gave way to the

forces of rapid evolution. First to do so were these methods which were most easily adapted, such as the loom, to the mechanical power. (1)

Of all the industries in America the Building Industry has been the slowest to develop modern methods and techniques. (2) The dissabilities of the industry are a result of accumulated custom and tradition, the blame for which can be placed on no one group.

In order to determine why costs are too high in the construction industry, and to see why the industry must modernize its ways, an examination will be made in the following paragraphs.

The local nature of the industry has retarded until very recently no one would think of building a house in one city, and shipping it for use to some place else. This tradition of site fabrication has saddled the industry for years. Strangely, there was a precedent in this country for prefabrication which might have caught on, but it did not. In Colonial days houses were sometimes shipped from New England and Louisiana to the English and French Islands. (3)

"Site fabrication, says Benn, sets a premium on laziness and dilatory methods in the building trade..!" (4)

(1) Bemis, F., "The Evolving House"

(2) Ibid.

(3) Clark, V. S., "History of Manufacturing in the United States 1607-1860"

(4) Benn, E., "The Return of Laissez-Faire p.149

Another industry handicap is the lack of organization. The building industry is not a definite, clear-cut entity, but a group of more or less related industries under one general heading "Construction".

The season production inherent in the building industry has also been one of its chief difficulties. Work on a house just about comes to a stop in cold weather, so that the results are felt not only by those directly building the house, but by the many people employed in the manufacture of the building products. The resulting economic effects are familiar ones, loss of income, loss of purchasing power, and the hardship infiltrates to other industries.

Many people place the blame for the great depression of the early 1930's on the fluctuations in the very unstabilized construction industry. The Committee of the President's Conference said, "Construction costs are high in part because of the seasonal hazard, which effects each step of the construction process from felling timber, quarrying rock, manufacturing brick, cement, tile, plaster, and the hundred and one other commodities; transporting these materials by railway, waterway, and highway, distributing them by retail supply dealers, clearing a site and excavating, to the completion and furnishing of the finished building.

" Idle time represents waste and direct losses to the construction industries and the workers and the public." (1)

(1) Committee report--Seasonal operation in the Construction Industry. McGraw-Hill Book Company, Inc. N.Y. 1924.

Most members of the industry have accepted these ills as traditional and have merely fallen into the pattern. However, a few straight thinking alert men, both from within and outside the industry, have realized that in the industrial production of houses the answer to many of their problems lies.

Too many people today build homes without competent advice and make many costly errors which tend to increase the cost of the finished product. Architects as a group, resist standardization. Most homes they design call for much special-built, but to order materials, which would be eliminated if the homes were standardized. For this reason Foster Gunnison, one of the big names in the Prefabrication Industry, is reluctant to hire architects for his plant, but prefers product-design men. (1)

Inefficient assembling of materials is a leading drawback. Imagine the excessive cost of the automobile if it were built in the archaiac manner of the home. The parts would be ordered from a dealer, or many dealers, and delivered to a person's home or business. The one who wanted the car would then hire a car-foreman to supervise the assembling of all the parts. First, many men would be hired. The upholsterer to do the seats, the metal worker to fashion the body to your specific needs and desires, the machinist to make the parts for the motor, the mechanic to put the motor

(1) Fortune April 1946

together, the electrician for the electrical work, and many other men to perform the various jobs which take place under one roof in an automobile manufacturing plant. The cost of an automobile would be so excessive that only the very rich could afford to own one. Instead, today it is considered a great hardship not to own a car. The same could exist in the housing industry if the industrial revolution which passed it up a century ago would at last come to roost.

The work of assembling and fabricating on the site is very wasteful indeed. It has not progressed a great deal since this country was in its infancy. The work involves a great waste in cutting, assembling and fitting of materials. Much of the work in house building is custom made. A look at any other industry, clothes, shoes or autoes, only serves to show that the custom-made method is the expensive one.

A little progress has been made. Doors are standardized, window frames are made in factories, but too much is made on the site, so the total reducing of the cost from these few manufactured parts is small, and ineffectual. The stairs, could be standardized, as could mantels, panels, (for both wall and floor) and many other parts. Standardization of parts does not mean standardization of houses. If the prefabricated house is ever to amount to anything this must be preached and shouted until all people realize that it is true, and believe it.

The management end of the construction industry is

as much under fire as the operational end. The industry is made up of many small operators who work on a "shoestring", without enough capital to carry them through a large project. Many of the speculative builders are in this class and it gives the industry a very unstable front. The small builder often cannot afford, or is not familiar with, the many labor saving devices that are available to him. Many of these small builders just don't have the ability. It is an obvious fact that many of the small builders are former carpenters, or often very skilled mechanics themselves, but they simply are not business men. Out of a group of sixty-eight builders, eight had been contractors, twenty-six had been carpenters, and six others building trade employees. (1)

In a report by the Federated American Engineering Societies many criticisms were aimed at the builders. Some of the leading ones are as follows: (2)

Use of inferior materials

Failure to properly train apprentices

Mistakes in estimating

Changes after work is completed

Failing to have sufficient quantities on hand

when men arrive on job.

As we have seen, the house has changed but slightly in structure and methods of erection for the past two hundred years. In some of the New England villages many of

(1) United States Department of Commerce "Causes of Bankruptcy" 1932

(2) Federated American Engineering Society "Waste in Industry"

the homes built during the Revolutionary War period could fit right into the modern village. Just as the house has not changed, the methods, we have seen, have not changed to a great degree, either. An examination of the organization which builds the house might reveal much of the reason for this apparent lack of change. The building industry is very difficult to analyze because, as we have said, it is so disjointed and separate.

The usual modern industry assembles materials in one spot, fabricates them in a factory, and ships out a finished product. The building industry, however, operates differently. Raw materials are shipped to the site, where each particular finished product is to stand. Instead of shipping the whole, the house is shipped in thousands of parts to be fashioned by workmen who bring their own tools--much as it was done in the Middle Ages. In addition to the raw materials being shipped to each site, the capital equipment, too, must be moved from house site to house site. Concrete mixers, steam shovels, wheelbarrows, etc., all must be moved from job to job. In addition to wasted time and the cost of transporting this equipment (all, of course, to be borne by the purchaser of the house in inflated price) much equipment is erected such as staging and concrete forms, only to be torn down when the job is completed to be scrapped.

Insecurity is given to the employees because most contractors hire men for the duration of a job only. They do not maintain a work force as it is commonly accepted in most industries.

The building of a house involves the use of many sub-contractors. A firm is brought in to do the plumbing, another the wiring, another the basement, and so it goes, with no one having the interest of the house at heart. One tends to be in the other's way, and hold up the work of the other--always building up the final cost. All materials are handled by many concerns through the channel of distribution. Each must get his percentage of profit, each adds to the cost of the house. A modern industry would buy direct from the manufacturer, or manufacture it himself, and save all this extra expense.

Not to be overlooked, in the increasing costs in the construction of a dwelling is the architect, or the woman who never is satisfied, and is always having things ripped out and re-done. It is certain work was never re-done on an automobile because it did not suit the fancy of the purchaser. Also, once the routing and scheduling of a modern plant is made up, the raw materials are ready and waiting. Not a day passes on a house under construction, that some time is not wasted while the boss runs to the hardware store for a box of screws, or to the paint store for a little more "turps".

The tragic thing about the construction set up is that the owner, or purchaser, does not see the product until it is complete and then, if it is not what was desired, it is too bad, nothing can be done about it. A car, or shoes,

or suit, or any factory fabricated commodity can be seen before the purchase is made.

As the author has attempted to point out, the extra handling and slipshod hit-or-miss methods of the building industry has resulted in waste, which results in higher costs. The Federated American Engineering Societies estimated that 53% of the annual construction bill represented waste (1) much of which could be saved with modern methods of efficient management and utilization of by-products.

The automobile is familiar to everyone as the prime example of mass production by modern methods. Perhaps however, they do not realize that almost every other commodity is manufacturing to a more or less degree, by methods embodying similar principles, with the glaring exception of the building industry. True, a few brave pioneers have attempted to manufacture houses in the past but the obstacles plus a public unwilling to help itself, has rebuffed them.

A striking picture of the stagnation of the building industry in comparison to other industries can be seen by studying production per worker sets of figures. The auto workers, 1923-1937 had an out per man hour of 46%; the steel workers in same period had output per man hour of 56%; workers in the paper industry had output of 52.5%. Construction workers costs were mounting but not productivity.

(1) Federated American Engineering Societies "Waste in Industry"

It is obvious that the production increase per worker is due to technological advances, not because man has grown any stronger. In fact, the increase in production per worker has been accompanied by a decline in the number of hours worked.

These figures are in striking contrast to the building industry, where very little increase has been made in production per worker. "Bricks are still laid as they were in the time of Moses". In the plastering trade, the plasterer's tools are almost identical to those of over a century ago.

The construction of large buildings and the erection of entire developments by one contractor has changed considerably in recent years and their methods are improved. When the big operative builder who might build five hundred homes in a development moves onto a job, he practically sets up a factory on the grounds. He employs much of the labor-saving machinery that is available. Such equipment includes electric band-saws, floor nailers, mortisers, drills, grinders, and many others. (1) But, sad to say, such improvements have not reached the small, single home builder. Much of the equipment is too expensive for him, so he continues in his old ways, and the public foots the bill. (2) The remedy to the situation, of course, is

(1) Interview with contractor
(2) Ibid.

known to some far-seeing people, but many obstacles stand in its path. The dwelling industry must be put on an equal plane with other modern industries. Until it is modernized and houses of a standardized nature produced in a factory and merely assembled at the site, the public must bear the burden by paying more than is necessary for his home either to own it or to rent it.

SUMMARY

Much criticism has been leveled at the construction industry. Every industry has changed greatly since the Industrial Revolution with the exception of the building industry. The local nature of the industry has retarded its development. The lack of organization, the seasonal production of houses, have all served to increase the waste in building a house. Assembling material at each site is very costly. Lack of standardized parts means much "making to order" which increases costs.

The organization of the industry is as much at fault as their methods. It is composed of too many small operators for whom it is uneconomical to be in business. While industries all around it were growing up and becoming closely knit, the building industry remained small and continued to erect houses as their fathers did, and as their fathers before them did also.

While the increase of productivity per worker has

risen many times in most industries, the production of the building worker is relatively the same today as a generation or even a century ago.

If the American people are to get better homes at lower prices they must be massed-produced for a mass market.

Isn't it here in full force today instead of still lingering as a "pioneer war"? There are many reasons why the prefabricated house has not replaced the traditionally-built house, and why it probably never will, completely. But, there is enough demand for houses in this country to satisfy both industries. The advent of mass production in the clothing industry still left the people who were so inclined the right to go to a custom tailor if they saw fit, and, too, shall it be in the housing industry. The people who feel that they must have a special built house will have the definite pleasure of going to a contractor and paying a higher price for their dwelling. But, for the mass of Americans, the prefabricated house, accompanied by a higher quality for less money, will be a gift from the gods.

At this point, no prediction will be made of the major obstacle in the path to success for the prefabricated industry. The three most important obstacles are labor unions, building codes, and vested interests, besides the problem of consumer acceptance, which was treated in an earlier chapter. In this chapter I will attempt to point out where

CHAPTER V

CHIEF OBSTACLES

The prefabricated house has been just "over the horizon" for many years now. Why hasn't it arrived? Why isn't it here in full force today instead of still bitterly waging a "pioneer war"? There are many reasons why the prefabricated house has not replaced the traditionally-built house, and why it probably never will, completely. But, there is enough demand for houses in this country to satisfy both industries. The advent of mass production in the clothing industry still left the people who were so inclined the right to go to a custom tailor if they saw fit, and, so, too, shall it be in the housing industry. The people who feel that they must have a special built house will have the dubious pleasure of going to a contractor and paying a higher price for their dwelling. But, for the mass of Americans, the prefabricated house, accompanied by a higher quality for less money, will be a gift from the gods.

At this point, an examination will be made of the major obstacles in the path to success for theneophyte industry. The three most important obstacles are labor unions, building codes, and vested interests, besides the problems of consumer acceptance, which was treated in an earlier chapter. In this chapter I will attempt to point out where

the conflicts exist and what the prefabricators are attempting to do to overcome them.

Of primary importance is the problem of the building codes. Present day government exercises a strict control over building construction. The basic reason for such legislation is the welfare of the people. There are laws to make dwellings safe from fire, to make them sanitary, and laws to make certain of the strength of the buildings. There are laws also directed to beauty, such as our zoning laws in most cities. The laws were passed because of many and varied influences, often conflicting, so that it is not strange that the regulations often act to thwart the very reason for their passage. Laws involving technical knowledge are made as any other laws, by representatives of the people, not by experts in the field. Often these laws are made because of the political expedience of the moment and not for the long range good of the people.

Regulatory building laws, or codes, are not new, nor a product of our country. As long as man had government he also had laws regulating construction. King Khammurabi, who lived in 2000 B. C. ruled by a civil code, a provision of which stated that if a dwelling collapsed and killed an inhabitant, the builder would be put to death.

During the reign of Augustus Caesar an ordinance was passed limiting the height of buildings to 70 feet. In 1212 in England a law was passed stating that all roofs were

not to be thatched, but made of tile. Gradually the building laws of every country in the world were enlarged and expanded until the modern building code as we know it today, emerged. (1)

In the United States the building codes take the form of local ordinances, usually conforming to some general state law. The Federal government at present has no jurisdiction over building laws except in the District of Columbia. (2) There are provisions which regulate almost every phase of house building from the cellar to the roof. The roof must be able to withstand so much pressure, walls and floors must be able to stand so much weight, etc.

There are provisions regulating the ratio between height and thickness of walls, the bracing of structural work, the spacing of girders, and the minimum dimensions of much of the materials. Herein lies the big obstacle for prefabricators.

Many of the prefab companies have developed systems and materials which offer as much structural strength or more, with lighter materials than the conventional builders. Especially at present, many new materials have been developed under the impetus of war which could be utilized in the construction of homes. The obstacle is that most codes specify certain materials instead of specifying certain standards that should be met.

(1) Burton, Frank "A History of Building Codes"
 (2) Bemis, F.W., "Economics of Shelter"

A typical example of this is a recent incident in Needham, Massachusetts. (1) A prefabricator was attempting to erect a house in the town for a veteran, but he was stopped by the building inspector because the house did not conform to a local ordinance that stated that the studs in the house had to be 2 x 4 18 inches apart. The prefabricated house used 2 x 3 12 inches apart, which, they proved conclusively, was stronger than what the ordinance called for, because their studs were nailed and glued both, while the code only called for the studs to be nailed. Yet, the building inspector forced the work to be halted.

Building codes represent a very important and necessary contribution of government to its people. They protect the public, both as home owners and as tenants. However, since a great many of them have been formed not on scientific lines, but to satisfy some local vested interest, they have served to increase the cost of building a house. Codes become obsolete as materials change, but seldom are they revised.

The building codes of the country have not been developed upon scientific data, but rather on compromises; they are not uniform in principle and in many instances involve an additional cost of construction without assuring

(1) Interview, Bemis Foundation

more useful or more durable building. (1)

The building codes of many municipalities often go too far under the guise of offering protection. They increase costs because they frequently require excessive strength. It is a common provision that floors should be able to stand 100 pounds per square foot. Ernest Flagg says that it is probable that most floors will never have to stand 10 pounds per square foot. The United States Department of Commerce in their "Requirements for Small Buildings" says that 40 pounds per square foot is adequate. Yet, many codes require 100 pounds per square foot, therefore increasing the cost of the house to the consumer, which means that many less people can own their own homes.

Building codes vary greatly from city to city, which also makes a formidable barrier for the prefabricators to hurdle. What is all right in Atlanta, Georgia, or Boston could never get by the authorities in Chicago. One of the worst abusers of the building code privilege politicians to shower benefits on friends in the victorious party. Prefabricated houses attempt to cut costs through standardization, which cannot be done if the houses must be altered to suit the needs of each city they are to enter. How far would the automobile industry have progressed if it had such a problem to contend with. If that industry had to change the structural strength of a car for each city it was delivered to the auto would not be within the reach of the masses.

(1) United States Senate Report of the Committee of Repairs and Construction

Some of the provisions of the building codes are almost ludicrous or they would be if it were not such an important situation. It is foolish, for example, to demand as many codes do, that the foundation for a frame house be twelve inches thick whether for a one-story cottage, on high dry land, or for a three-story building built on a swamp. Most codes assign the size of lumber not the quality, which places an emphasis on the use of much poor material to cut costs to make a larger profit for the unscrupulous dealer.

However, the building codes must be faced by the prefab industry if it is ever to flourish. One point in their favor is that the codes are mostly in urban areas, which leave the rest of the country free for exploitation, (so far as codes are concerned.) What is the industry doing about these legal knots?

The Industry as a whole took a collective step when it formed the Prefabricated Homes Manufacturing Institute. This is an agency established by about 65% of the prefabricators to sell their ideas, and also as a lobbying group. The Institute is headed by Harry Steidle, formerly with the United States Bureau of Standards and the Douglas Fir Plywood Association.

Individually, many of the companies in this field are active as "code Busters". One of the leaders is the aggressive Homeola Corporation. Following is a typical instance of how they are attacking the problem. (1)

(1) From an interview between Mr. Willis of Homeola and a Representative of the Bemis Foundation

Because the design of the HomeOla House is not conventional in appearance they were called upon to do a great deal more "code cracking" than most companies if they were to be allowed to erect their houses.

HomeOla had an opportunity to sell a large number of houses for a veteran's project in Lincoln, Nebraska but their house did not meet the requirements of the local code. Mr. Willis, ever on the alert, went personally to Lincoln and talked things over with the Mayor and others. He sold them on the virtues of HomeOla housing and agreed to provide 200 of the 1000 houses that Lincoln figured it needed for their Veterans Emergency Housing Program.

The outcome of the visit was an agreement between HomeOla and a local builder for the latter to erect five HomeOla houses to demonstrate them and to test reactions. The houses, as has been said, violated the existing Lincoln building code, but this was to be waived for the first five houses for trial purposes. If the houses were successful, Mr. Willis was to return to Lincoln to aid the city officials in re-writing the building codes to permit the use of pre-fabricated houses.

This was not all that HomeOla did in Lincoln. Mr. Willis sent a company man down during the construction of the houses for the sole purpose of public relations. The representative was to stay close to the job and listen. If he heard any detrimental talk he was to try to straighten it out. Especially he was to listen to complaints from builders

to see how they felt, and to assure them that HomeOla was not cutting them out because they would have the job of erecting the houses.

Certainly such a code-cracking job is effective. If this were repeated thousands of times throughout the country the problem of labor codes would be solved. (1)

One of the important departments with any of the leading manufacturers of prefabricated houses is the legal department, whose job it is to solve the code problem. HomeOla is not alone in the type of program mentioned above. Every prefab of any size is doing the same thing. However, there is a feeling in the industry not to try to crack some of the cities that are considered impenetrable such as Chicago. Their reasoning is that there is enough territory to sell the houses without butting against a stonewall. Also, the industry feels that if the houses gain recognition in other sections of the country, public opinion will force the politicians to alter their building laws.

It is for this reason that the industry is attempting to put its best foot forward. (2) Many companies who are not yet producing, and others who are not producing as much as they would like to, could gain much product on if they were willing to sacrifice quality, which they won't do.

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- (1) Interview between Mr. Willis and representative of Bemis Foundation
 - (2) Interview Bemis Foundation and writer

The industry is fully aware that if the houses they erect now are unsatisfactory it will set prefabricated housing back twenty years. There is a demand now, because of the critical shortage brought to a head by the war. There is enough of a demand so that both conventional builders and prefabricators can be kept busy, almost regardless of their product, but the prefabricators want to give value because only in this way can they win public acceptance.

Not only are the manufacturers trying to crack the codes, but so are other organizations. The United States Chamber of Commerce has a man who does nothing but go around and confer with the local chambers of commerce in an effort to get them to aid in libera lizaing the codes. It is, of course, many of the men who are on the building code's committee of the various cities, who are most desirous not to see the codes changed. Such people as builders, etc. are included in this category, but this will be considered later.(1)

The Federal government through the Department of Commerce has done much valuable work in attempting to have the building regulations relaxed. Many of the state governments ~~have taken~~ a forward step forward, and therein lies the greatest hope. Massachusetts is one of the leaders in attempting to show the way for the municipalities, so let us examine what progress has been made there. (2)

Because of the emergency created by the demand for veteran's housing, Massachusetts has done two things. First,

(1) Interview, Bemis Foundation
 (2) Ibid.

an Emergency Planning Board has been created. This Board has the right to override any municipality or local building code, and make it stick. The case in Needham, mentioned before, is typical of how this board acts. (1)

The Needham building code called for 2 x 4 every 18 inches for studding. The prefabricator, who had already been issued a building permit, was placing his studs every twelve inches, but they were 2 x 3 not 2 x 4. The building inspector stopped the erection of the houses.

The prefabricator appealed to the Emergency Planning Board who conducted a series of tests. The outcome of the tests was that the prefabricated house was stronger than the requirements because they were using nails and glue, not just the nails called for by the code. The Board then issued an order that this prefabricator be allowed to build his houses in Needham, and the town was forced to go along.

It is readily understandable that if the prefabricator have something to offer, but is being "hamstrung" by building codes, such a board is a great help. But Massachusetts has gone a step further.

House Bill #46 of the Massachusetts House of Representatives is a bill which, if passed, establishes a State Building Code. Today two-thirds of the communities in the state have no code, and this State code automatically becomes the law of these municipalities. The other cities and towns may adopt the state code if they so desire, but it is

(1) Interview, Bemis Foundation

mandatory that they adopt it if it is more stringent than theirs. (1)

Also, and this is the important thing for the prefabricator, it creates a permanent board similar to the emergency board described above with the same powers.

This type of thing is going on all over the country. Towns and cities, being driven by the veteran's needs, and politicians, not wanting to appear unpatriotic are changing their codes. It is a movement which is going on all over the country and the result is going to be a much greater area where prefabricators can go in and operate.

SUMMARY OF CODE PROBLEMS

The country is suffering from the multiplicity of minor and conflicting ordinances in the various codes. Piled high in the thousands of towns throughout the country they resist and impede all change. Any effort toward standardization is met by endless and excessive requirements. If a firm was to standardize its product to be sold wherever there is a code, the house would have to be maximum in each minute detail for each building code. The result would be a house of such great cost that it would be prohibitive. Fortunately, driven by the force of houses for veterans, the towns are beginning to see the light and there is great hope that this problem will be solved in the near future.

(1) Interview, National Housing Administration

The second major problem which the manufacturers of prefabricated houses must surmount before they can be recognized as a major industry, and before they can fulfill the great promise which their champions claim for them, is the labor union resistance. To completely understand this problem an examination will be made of the building trades unions as they exist at present.

The subdivision of work described in another chapter as one of the reasons costs on a house are excessive, is carried even further by the building trades. In some large cities as many as fifty different crafts are organized, and possibly all might be used in a building--certainly many of them will be. (1)

The employers' organizations in the building industry are very loosely organized and do little to unify the industry. As has been said, this loose organization contributes greatly to increased costs. Quite the opposite of this is the building trades unions. These unions are a very militant group, ruled over by a virtual dictator, which were created for the specific purpose of securing and maintaining a high wage rate, shorter hours of work, and many other advantages.

The basis of the trade unions is the local. This local covers a certain craft in a certain community or area.

(1) Bemis, "Economics of Shelter"

These locals belong to state or central unions, and the centrals in turn belong to national unions. The national, in its turn is a member of the American Federation of Labor. Although affiliated with the American Federation of Labor, the building trades are a very autonomous group, headed by "Boss Carpenter", William Levi Hutcheson.

Hutcheson's power comes from his position as president of the United Brotherhood of Carpenters and Joiners. This gives him jurisdiction over all the men in the United States who work with wood, from logging right up to the most skillful cabinet work. (1) It is this complete power over so vast a domain which caused to be said, "God made the forests and He gave them to Bill Hutcheson". (2) Any attitude of the building trades union on any major question is merely reflecting the personality and thoughts of their director.

The philosophy of the building trades is that there is just a certain amount of work to be done, and the longer they make it last, the more employment there will be for their members. Unions have resisted any labor-saving devices (3) and have fought bitterly against revolutionizing the industry, such as prefabrication would do. The job is cut out for the prefabricators to educate union leaders and

(1) "Boss Carpenter" Fortune April 1946
 (2) Ibid.
 (3) Ibid.

members to the fact that the work is not of a diminishing nature, but will always exist.

The unions, in protecting as they claim tom the work of their members as producers, forget that their members are also consumers, and as such would benefit from the industrialized house. (1) It is essential to these workers to have low-cost housing available to them if they are to enjoy a high standard of living. There are approximately twelve million union members in this country. Anything that affects them must also affect thier families. Assuming that there are four persons to a family, this makes forty-eight million people who might benefit from the low cost housing which groups with whom they are associated are retarding.

The picture is not as bleak as many would believe. Some labor leaders realize it is to the benefit of all to reduce the costs of housing, and these men will either convince the others, or organize the building trades themselves.(2) The Housing Committee of the UAW in its "Memorandum on Post War Urban Housing pointed out that, "By far the majority of our citizens ~~have~~ lowannual incomes...one of their essential needs is not adequately met by our economic system; the very greatest potential mass market in this country is therefore waiting for a solution to its housing problem, at a price it can afford to pay".

(1)H eineman, Hans, "Prefabricated Homes" May 1945

(2)Ibid.

This above mentioned memo goes on to say much about the shortcomings of the present builders and the unsoundness of their methods. This of course, is a slap at the builders trades unions and their restrictive measures which do much to keep the cost of houses high. (1) Such practices as not permitting spray painting and use of copper tubing rather than specified lengths, must be stopped.

The insistence of jurisdiction by the building trades is one of the greatest causes of conflict and increased costs. This insistence on jurisdiction means, frequently, that high priced skilled labor must be employed to do work that less skilled men could do, at a great saving to the buyer of the house. Following are a list of some of the increases in cost due to jurisdiction.

Carpenters' helpers cannot use carpenter tools and therefore cannot do such unskilled work as stripping concrete forms. Plumbers must carry tools and equipment between floors at plumber's rates of course. On one job a contractor was forced to hire a union engineer at \$18. a day simply to start a pump, oil it occasionally, and stop it at night. (2)

As excessive as these costs are, they do less to restrict construction than interruption due to jurisdictional strikes. "This is one type of strike which cannot be defended on any ground and should be outlawed", says Eric Johnston,

(1) Heinman, Hans, "Refabrication"
 (2) Federated American Engineering Societies "Waste in Industry"

past president of the United States Chamber of Commerce. These strikes over whom shall perform what job have cost millions of dollars and driven many contractors into bankruptcy.

This problem is not a new one, nor is it condoned by all labor leaders. Samuel Gompers said at the 1902 Convention of the "A.F. of L." "Beyond doubt the greatest problem, the greatest danger which threatens not only the success but the very existence of the A.F. of L. is the question of jurisdiction. No combination of labor's enemies need cause us the apprehension which this fratricidal strife does in the claims made by the unions for the extension of their trade jurisdiction".. (1)

As has been said, the attitude of the building trades largely reflects the attitude of Mr. Hutcheson, who is opposed to prefabs, so the trades are opposed to them because the Dictator says so. They are convinced that it is for their good not to have prefab but to maintain the status quo. What are the prefabricators doing about this problem?

Again, it is one of the functions of the Prefabricated Home Management Institute to attempt to counteract this with an educational program aimed at winning public opinion.

Again, it is one of the functions of an aroused populace to overthrow a dictator and it can do better than "Big Bill". The unions already have showed signs of weakening to get houses for veterans.

(1) Hoder, William, "Industrial Relations in the Building Industry"

The educational program is not only being carried on by the Prefabricated Homes Management Institute but by many of the individual companies. As Foster Gunnisson has pointed out in American Builder, the average building trades worker today gets only 178 days of work per year. If the housing industry were industrialized and the work moved into factories, the workers then would get year round work. (1)

Another reason that the building trades are starting to become more reasonable to prefabricators is that they are afraid of the rival CIO. Bill Hutcheson is more responsible for the split from the A F of L by John Lewis to form the CIO than any other individual, (2) and this rival for which he is greatly responsible is liable to swallow him up unless he becomes more reasonable. The CIO already has made a start toward organizing many of the building trades and Mr Hutcheson must realize he must do something to check this, if he is to maintain his power. One of the things he can do is to realize that the housing industry is one of the most backward industries in the country. In some of the other industries the unions often try to work with management, not against them. The Steelworkers union has come up with some technological advances which have increased the output of their workers and have used this as a reason for demanding a higher wage. Not so in the building industry where the

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- (1) "Prefab by Gunnisson" American Builder Feb. 1945
 (2) "Boss Car enter" Fortune, April 1946

unions retard, but never increase the productivity of the worker. It is an uneconomic situation which must be set right. It is one of the major reasons millions of Americans are being deprived of the chance to own a home.

As in breaking down the building codes which retard the prefabrication industry so too, is there a pattern to win the confidence and cooperation of the labor unions. One of the most advanced and interesting experiments of this nature is taking place today at the Beach Aircraft Plant in Wichita, Kansas. Many people will admit that labor has risen to the point where it should have a voice in management, and when it does, labor-management problems will no longer exist for their aims will now be one. This premise is now being experimented in Kansas. (1)

Buckminster Fuller, designer of the Dymaxion Dwelling Machine, which will be discussed in a later chapter is attempting to produce his houses in the old Beach Aircraft plant. When Mr. Fuller started his company he was aware that if it was to be a successful proposition he must have the full cooperation of labor. He reasoned soundly that the best way to get this cooperation would be to include labor men in the management end of his concern. Let us look at the "strange bedfellows" on his board of directors. There is William Wasserman, a Philadelphia capitalist; Lawrence Hartnett, president of the General Motors of Australia; Harvey

(1) Information taken from "Business Week" Feb. 10, 1945

Brown, president of the AFL Machinists union, and a seat is vacant now awaiting a representative of the CIO Automobile workers union. There are other members on the board representing both labor and management, headed by the designer of the house, Buckminster Fuller.

What Fuller does in Kansas City may be the pattern for the entire prefab industry, if not for industry entirely. Certainly it is a forward step, and one which deserves praise. The AFL Building Trades have been, as has been said, a thorn in the side of the prefabricators for years, and perhaps Mr. Fuller has the solution to the problem. For the first time in American Business a corporation was formed which asserts in its charter that it will "provide through a corporate medium an organization to be managed and directed by labor, capital and science to their collective profit."

The company was able to make this tie up with the unions because of the extra work it provided for the men of the aircraft industry who were out of work due to contract cancellation after the war was over. This new industry can utilize both the plants and the men of many of the aircraft companies who no longer have use for them. (1)

In an interview with a representative of the Anchorage Homes, Inc. it was learned that their handling of the labor union problem was not as revolutionary as the Dymaxion idea, but it the one most likely to be used on a large scale. (2)

(1) Business Week, Feb. 10, 1945

(2) Interview Mr. King, Sales Department, Anchorage Homes, Inc., Feb. 1947

Obviously, the Fuller idea won't be adopted completely, or even by a major part of the companies because most members of management still are not ready to take in labor leaders to share in the management end of the business.

The Anchorage plan is a more practical one. They have already signed a contract making their plant American Federation of Labor. They did this willingly, making the first advances to the unions, and therefore won their cooperation. In addition to this they have canvassed the unions in the area which they intend to operate now (250 miles) and have been assured their cooperation.

Anchorage Homes, Inc. was the first prefab company to issue stocks which could be bought by the public. In order to do this it was necessary for the company to insure the SEC that they could produce, and sell houses. The labor problem was one of the big question marks, and the SEC wanted to know what Anchorage intended to do about it. Therefore, accompanying their application for a stock issue was a letter from the president of the Massachusetts A F of L Carpenters Union. This was the man who had, almost life or death hold over construction in Massachusetts. This letter has stated that Anchorage would receive his full cooperation and he liked their plan for the following two reasons:

1. Producing homes in a factory would increase the annual earnings of his men because of the stabilized work throughout the year.

2. The second reason given was that many of the members of the carpenters unions themselves could not afford to own homes even if they wanted to and if producing

homes in a factory would enable more of his workers to achieve their desire of home ownership, he would go along with it.

The union problem is not so much getting the homes produced, as many companies have found, but it is getting the homes erected on the site. It is for this reason that Anchorage has gone into the field and attempted to make friends with the union throughout their region of distribution. Of course, being practical, they realize there are certain hotbeds which cannot be cracked immediately. They will pass over these spots for a while in the hope that the erection of successful houses in surrounding areas will foresee the unions to let them in.

SUMMARY UNION PROBLEM

The American Federation of Labor Building Trades Unions are opposed to prefabrication because they feel it will deprive their men of much work. The unions have retarded the development of prefabrication by strikes, restrictive measures, low productivity, and by not allowing technological advances.

This resistance by labor is being overcome by the prefabricators. They are doing a selling job, convincing the unions it is for their members' benefits to have lowcost housing. In one case union leaders have even been put on the board of directors of a corporation.

Public opinion is in favor of housing of every sort because of the veteran's emergency and unions are being forced to cooperate.

In conclusion, where unions have retarded prefabrication in the past, certain forces are being brought to bear which are gradually winning union cooperation. A company who is willing to deal sensibly with the unions has found it possible to secure their assistance and, therefore, have made a big step forward toward industrializing the housing industry.

The third obstacle listed as a major one is that of vested interests. The vested interests in this case are a collection of groups in the building industry who favor maintaining the status quo. These groups, while opposing the prefabrication movement, and disliking it very much, have not been able to do as much harm as the aforementioned two. It is just that they have not been cooperative.

Such vested interests include builders, building material manufacturers and dealers, real estate brokers, and almost any other group that makes its living from the present building industry.

As has been said these groups have not been as active in expressing their dislike for prefabrication as have the other two groups. These interests have, however, retarded the development because of their unwillingness to cooperate and to push the new industry. Information on this

topic is garnered more from interviews and long association with people in the various phases of the building industry. The attitude seems to be that "it just will never come" and they refuse to become alarmed about it. Rather than get on the bandwagon and help the young industry, and by helping it get in on the ground floor they just sit back and wait.

In the past, the manufacturers were smug behind attitude that things were all right theyway they were, and refused to pioneer. They assumed that if the industry ever did become successful, their products would still be purchased by the prefabricators instead of dealers, and if it did not go over, they were all right as they always had been. There are some giants in the building material manufacturing field and they stood to gain little from prefab because they already were so firmly entrenched in the industry as it was. They were afraid that if some housing companies got too big they might manufacture themselves and thereby not be customers any longer. Such giants are John Mansville, USG and a host of others.

Other companies' however,ve recognized a growing market by producing homes for the masses and either have gotten into the field directly or have developed methods which they licence to builders. Such a company is the CelloTex Corporation.

Not only is CelloTex actively engaged in prefabrication, but the son of the president of the company is the principle producer of houses built according to the

General Panel Corporation System and much of the stock is held by the president of the CelloTex Corporation. The HomoSote Company, too, is entering the prefab field and their product was discussed in an earlier chapter.

Not only have manufacturers gone into prefab but, so too, have many of the leading building material dealers. Johnson Lincoln Company of New Jersey sell their house through Wanamaker of Philadelphia. City Lumber Company of Hartford, Connecticut produced much war housing and has remained in the game.

It is becoming obvious that while many dealers still refuse to recognize prefabrication as an industry, or see its potentialities, some of the more aggressive concerns have. It is the writer's firm opinion that the building material companies who do not enter the prefab field in some form, either as a dealer or as a distributor, will some day be very sorry. Obviously prefab will never replace the conventional builder. There are too many people who want expensive homes, which is not the prospective market of the prefabricator. Clubs will always have to be build, theatres, night clubs, office buildings, and similar buildings. Some things do not lend to prefabrication. The very idea of a night club or store design is to be "different". So long as people want "something different" there is the need for the conventional builder and his suppliers. Large office buildings even today are erected making use of mass production methods. These are not the aim of the prefabricated house

industry. But the low cost house produced for the masses who never before have been able to afford to own a house, and the people who don't mind a certain amount of standardization in order to get more for their money are definitely the object of the prefabricated house industry.

All the above is by way of saying that the conventional building industry will still exist, but there is a great untapped market which aggressive concerns will want to take advantage of. Those companies who wish to grow will enter into the prefab field as many already have, not necessarily as a main business but as a subsidiary. Other companies who choose to stand still and not enter the field are in reality slipping backwards, because in business there is no middle ground. "You can't stand still, you must either go forward or slip backward". (1)

SUMMARY VESTED INTERESTS

While in the past people in the building business have been either apathetic or opposed to prefabrication, now many of the more aggressive firms are joining in the prefab movement, and as the industry takes hold and emerges, many others will follow suit.

There are other obstacles, minor ones, such as banks not wanting to make loans on prefabs, but that opposition is fast melting. Financing of the house will be treated in a later chapter.

(1) Wells, R. Professor, Boston University College Business Administration

The largest and most troublesome problem yet to be hurdled is that of consumer acceptance. This, too, will be handled later.

The obstacles which confront the young industry are many and varied, as is always the case when something new is proposed. There will be an evolution in the building industry not the revolution it needs. However, prefabricated houses are starting to spring up all over the country because of the constant overcoming of obstacles by the members of the industry. There are today far less obstacles than there were years ago, when blood ran through the streets in a fight between union men and Gunnisson employees erecting a house. (1)

As many obstacles have been overcome in the past, so they are being overcome today, and a new industry is gradually appearing on the horizon. It is an industry which Roger Babson says holds more promise than any industry in America today.

(1) Fortune, April 1946

CHAPTER VI

MARKETING

A survey of any growing industry would hardly be complete unless the marketing of the product is studied. It was explained in previous chapters that the prefabricated house is a certainty so far as producing them is concerned. Many systems and many companies have devised ways of producing homes in a factory and transporting them in pieces to the site of the house. It is not a production problem at all (1) that is retarding the industry, but the many complex features that we have discussed.

The big problem for the prefabricators to solve is getting the people to buy the house. Included in this problem is getting the house to the customer. That is, how will the companies distribute. This problem is not as easy as it would seem for there are many factors to be taken into consideration.

Foster Gunnisson has delved into the economics of distribution problem, (2) and has come up with some conclusions.

A. There is no point in making anything

(1) Interview Bemis Foundation

(2) Gunnisson, Foster, "Economics of Mass Sales in the Mass Distribution of Prefabricated Homes"

unless it can be sold, therefore a determination of whether or not it can be and how it will be transported to the purchaser must be made.

B The product must be designed to fit the market with full consideration given to price, cost, investment and profit.

C The prefabrication industry has grown in its early days along architectural and construction lines to the extent that while many companies manufacture the houses they do not have the industrial organization to work on mass production principles. Mr. Gunnisson feels that too little thought has been given to the distribution of the houses, to the extent that it will hamper the growth of the industry, because the three elements, production, distribution and sales are not in equal balance, as they must be for a successful business.

D Home building of the traditional type does not get a fair share of the consumer's dollar. This is so because all other big industries have industrialized and applied principles of mass production to the extent that they offer the consumer more for his money; in order to get the fair share of the consumer's dollar, the residential house industry must completely change and follow the pattern of other successful industries.

E During the war the prefab industry developed along a quantity-production basis; they were produc-

ing for one buyer, Uncle Sam, and did not have to worry about selling, but to survive in a normal market the industry must change to mass production.

F Mass production means a predetermined number of houses rolling off an assembly line every day. An automobile comes off the conveyers every three minutes, and a refrigerator every 25 seconds. It must follow that orders must flow into the factory at the same rate. If orders are not in line with production the result is a slowing down of the system which means costs will rise and the savings that would result from mass production will be absent. A large mass production plant requires such a huge outlay of capital that in order to be successful it must operate at or near capacity all the time.

G It follows then that the most important problem confronting the industry is mass distribution and mass sales. No new tricks have to be devised, the pattern has been set in other mass production industries.

H In quantity production for quantity sales, houses were built for large housing projects, perhaps a thousand for one development. This is what the industry was engaged in during the war, and must be changed now. This type of sales does not supply the diversification necessary to warrant huge outlay for plant and equipment which is required.

(H continued)

Mass distribution would provide a system of selling the goods throughout the entire country, blanketing every city and town of sufficient size to warrant it. This will allow for regional slumps and with the help of the law of averages provide the steady stream of orders so necessary to mass production.

I. Mass distribution is not only a great aid to the manufacturer, but it provides protection to the dealer at the same time. Under mass production and distribution he would land a big contract and perhaps sell one thousand houses. This would provide a great deal of work for him and his organization. However, when the job was completed overhead would continue until he landed another big order, or else he would have to lay off his men, which would mean all the hazards of the conventional type of construction as far as his men are concerned. Diversified sales would call upon him to sell houses to many individuals, which would provide a relatively steady supply of work.

J. "It will thus be seen that the principle of mass distribution, mass sales, is based upon the continuous flow of administrative sales and production effort carefully synchronized to conveyor speed. It is made possible through diversification, the spreading of the sales risk that is achieved through the aggregate volume of individual sales to individual customers. That is the meaning of "

of "mass sales". (1)

K. A conclusion to the above eleven steps is that in order to handle efficiently the multitude of orders that will flow from many individual sources there must be standardization of product and organization so as to provide homes of greater value at less cost to more people.

For the purpose of this chapter we will assume that all "bugs" have been cleared away and the industry is ready to distribute on a national scale. The reason for distributing on a national scale has been stated previously. The next logical step is to determine the best way to cover this large area.

Many of the leading companies intend to distribute regionally, at least for the present, but others already are starting to build their national organization. As closely as the writer could determine, those companies that intended to distribute nationally plan to set up their own dealer organizations throughout the country. Leaders in this type of organization are the aforementioned Gunnison, and the Fuller group.

What will a large national operator like Gunnison expect and look for in a dealer? How will he go about selecting his men?

Gunnison feels that in order to protect the trade

(1) Gunnison, F. "Mass distribution and Mass Sales of Prefabricated Homes"

name, which will become a symbol to the public, of quality he must control the erection and servicing of the houses. The dealer becomes the sole connecting link between the customer and the producer, so much care must be taken in his selection.

The dealers must be given a complete line of catalogues, advertising materials, sales kits, erection and service instructions and all the necessary forms, accounting systems, etc. with complete operating manuals for each department in the dealership. It will be a very centrally controlled type organization.

Through trial and error the best methods for every operation will be evolved. Then the next step will be to establish as many duplicate dealerships throughout the entire country, as possible.

The Gunnisson Company already is being besieged by thousands of letters requesting dealerships (1) and they have worked out a very scientific method of selecting localities and individuals which is worth studying. Gunnisson is far ahead of any other company along these lines and it is quite possible that he will become the pattern which others will follow. Just as the automobile industry started successfully along these lines for General Motors, then the others soon followed successful operation.

(1) Information on Gunnisson Homes supplied by requested information

From a marketing standpoint Gunnisson has divided the country into nine regions which are broken down into forty three areas. In the more thickly zones the areas are broken down into approximately one hundred fifty districts. The Sales Organization thus consists of Regional, Zone and District Sales Managers. A district sales manager is responsible for the operations of about fifteen dealers.

At present Gunnisson is distributing only within three hundred miles of their plant at New Albany, Indiana. A dealer will be appointed for each town of over 9000. When this area has been filled with the necessary dealers they intend to spread their area to 300 miles, and so on until the entire country is blanketed.

When Gunnisson is ready to establish a dealership within a certain district or zone, Market Analysis men are sent to make a town market analysis. The sales potential is appraised as well as any difficulties that may be encountered with building codes, unions or mortgage financing. This knowledge is essential in order to determine the qualifications which the dealer in that community must possess.

After all of the towns in a district have been surveyed they are studied to see which, if any, are most worthy of attempting to serve. If it is decided to develop the area a district sales manager is assigned. This man visits each town and takes with him a Town Survey of Prospective Dealers on which are listed all of the applications received from people desiring the agencies. Each applicant is investigated and through bankers, chambers of commerce, and other means, additional prospects are discovered and they are invited to apply.

There is a Dealer Franchise Committee whose function it is to actually select the dealers. This committee is composed of five experts in the fields of Labor, Unions, Financing, Dealer Management and Retail Sales.

Each applicant is graded according to the qualifications necessary in that particular town. The applicants receiving the highest grades are invited to attend the Gunnisson Homes Institute Basic Course, after which they are interviewed by the Dealer Franchise Committee. A dealer is selected to be general manager of the dealers, but also local dealers for Sales, erection and servicing must be selected.

When the Committee has decided on the men it wants it signs a Recommendation for Appointment which goes to the vice president and General Sales Manager. The dealer and his whole staff are required to take the Dealer Training Course in the Gunnisson Home Institute. Upon successful completion of the course the vice president and general manager then endorse the Committee's Recommendation and it is sent to the Secretary of the company who issues the dealer franchise.

After the franchise has been granted the company sends out all the sales aids, advertising campaign, erection kits, catalogs and other promotional material. The District Manager supervises the dealer in setting up his office and showroom. An initial demonstration home is sent from the plant and an expert erection man accompanies this initial house to instruct in its erection.

From then on, the District Sales Manager supervises the dealer. The dealer is required to send weekly sales reports and monthly financial statements and he also must sell the quota established by the Dealer Franchise Committee.

The preceding paragraphs go into detail about the mechanics of choosing a dealer. The obvious question remaining to be answered is what type of man makes a Gunnisson dealer. The company has very set ideas on this, also.

Immediately dismissed from consideration as dealers are the curious type of mechanical-minded people who would be very interested and enthusiastic about erection, but would be poor on sales. This type of man always has a tendency to try to improve the house, a practice which Gunnisson will not tolerate. All houses must be to exact specifications from the factory so as to be as they will appear in advertising and in the catalogue.

The Gunnisson Company does not want men whose interest in prefabrication lies in design problems because the dealers are to sell, not redesign the houses. Also excluded are men who are temporarily individualists because they are unable to operate along uniform methods of procedure.

The old line building industry, says Gunnisson has produced just such individuals because of its loosely-knit organization. These men are not the Gunnisson type.

The Gunnisson ideal is a sound, solid business man who has a record of success in his community. He must be a capable executive and know the necessity of maintaining a good sales volume, erecting houses properly and providing proper service for the houses.

Since the life blood of the industry is "sales", Gunnisson looks for men who are particularly minded. He wants men with sales experience in selling such standard items as cars, refrigerators and pianos.

The dealer must have a keen sense of public relations and realize the necessity for requiring the entire organization to conform to uniform pattern of operations.

An important item is that the prospective dealer must have sufficient working capital. The final important qualification is that the dealer devote himself exclusively to the Gunnisson House. If they have large established business, they must establish a separate company with a separate organization, and above all, no Gunnisson dealer may carry another line of prefabricated houses.

Outlined above is the method by which one of our foremost prefabricators intends to distribute his houses, and how he intends to recruit the men to form his national network. It is obvious that it is a scientifically planned procedure, leaving as little as possible to hit-or-miss methods. This is the only company from which the writer

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was able to procure any more than a sentence or two on the subject of marketing, or distribution which leads the writer to believe that other companies have not given it the same thorough consideration that the Gunnisson concern has.

The Gunnisson Company is, however, certainly not alone when it comes to attempting to distribute on a national scale. The Homosote Company of Trenton, New Jersey has gone into the prefab game also. (1) They are primarily a manufacturer of Homosote wallboard and other building material products, but like others, they have seized this opportunity to broaden their market. Homosote has formed a company called the Precision-Built Homes Corporation.

Precision-Built Homes Corporation intends to license builders on a national scale to use their system for building homes. They intend to market their product through conventional outlets such as building material dealers and local contractors, and also they intend to exploit to a great extent the use of department stores in the sale of the prefab houses.

The company was active during the war, and had shown houses in forty of the leading department stores throughout the country as early as 1944. The largest precision built house sells for \$4000, which could be lowered under normal conditions of sufficient supply.

(1) Business Week November 16, 1944

The sale of houses through department stores is truly a revolutionary stroke. It has been tried before, but mostly for exhibition purposes and not really for sales. But the Precision-built outfit has done a good job in lining up some of the largest department stores in America, such as R. H. Macy of New York, Barker Brothers of Los Angeles, and Jordan Marsh of Boston. These are already lined up. It is safe to predict that if stores like the above are successful, smaller stores will hop on the bandwagon.

The department stores are the exclusive agents in a territory and receive 5% even when the customers purchase direct from the builder. The department stores will do nothing with the erection of the houses, they act solely as selling agent, hence the 5% commission, for that is the accepted commission on a house throughout the country.

Another thought on distribution is that put forth by the Anchorage concern. They intend to distribute only through recognized realators who are members of the National Association of Real Estate Boards. Their reason for this is the type of service which they intend to offer. It has been shown that the Gunnisson Company intends to deliver the parts to the site where the dealer will erect it. Not so the Anchorage Home.

Upon receipt by the corporation of a firm order for a house and completion of financing arrangements, local sub-contractors will perform the excavation and foundation

on a unit cost basis. Upon completion of the foundation the houses will be shipped to the site in company trailer-trucks where they will be met with regional crews equipped with truck cranes. (1) All the erection, though done by regional or local crews will be controlled by the corporation and not the dealer as in the case of Gunnisson.

Anchorage is so confident that they have a worthwhile product that they guarantee the house for one year. To the best of the writer's knowledge, this is the only company to make such an offer.

The Realtors who become Anchorage dealers will not have exclusive franchises in a area. They will operate much as they have always done as real estate brokers and receive the usual 5% commission.

All interests who derive their income from the housing industry in any form are interested in the development of this new industry. Whether they be real estate brokers, material dealers, builders or large contractors, they are interested in what effect this new industry will have on their particular business. Many of the companies who normally might be opposed to the development of pre-fabrication are somewhat appeased because they feel they might get a profit from the new industry as a dealer. Because of this widespread interest among realtors, the

(1) Anchorage Homes, Inc. "Your New Home"

National Association of Real Estate Boards made quite an exhaustive study to determine the effect prefabrication would have on normal real estate business. (1)

The report was analyzed and released through "Headlines", the official organ of that Board. Questionnaires were sent to 351 companies who were either in the prefab field, or demonstrated an interest in that field. "Headlines" reported that this list represented as nearly as was possible the actual or potential prefabricators in July, 1945. (2)

Of the 351 queried, only 69 responded. "Headlines" felt that this was a large proportion compared to other surveys which they had previously conducted, and so took this large response as a sign that there was great interest in the industry.

It must be kept in mind that this survey was conducted by the NARB, and they would naturally interpret the results as favorable to their members if at all possible. The actual figures from which they drew their conclusions will therefore be included in this thesis and the reader will be able to draw his own conclusions and to compare them with the conclusions of the surveys which will be presented later.

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- (1) "Prefabricated Homes and the Real Estate Market"
Commercial and Financial Chronicle
(2) "Prefabricated Homes" Headlines, July 30, 1945

TABLES

1. Do you expect to manufacture prefabricated homes
after the war?

yes	37
no	10
don't know	18
yes, for export	2
undecided	2

Some of the "don't knows" would like to stay in, but were not sure they could get the necessary financing to compete for a civilian market.

2. DO YOU PLAN TO DEVELOP YOUR OWN SALES ORGANIZATION?

yes	25
no	9
don't know	3

Although a wide majority of the companies plan to utilize their own dealers, there were many varieties of plans with Gunnisson's being the most extensive.

3. DO YOU PLAN TO DEVELOP STATE OR AREA DISTRIBUTING
AGENCIES UNDER WHICH LOCAL SALES AGENCIES WILL BE EXCLUSIVE
AGENTS IN THEIR OWN COMMUNITIES?

yes	19
no	11
don't know	4
did not answer	3

4. DO YOU INTEND TO SELL THROUGH WHOLESALE DEALERS TO
LOCAL DISTRIBUTORS SUCH AS

	yes	
real estate offices	6	6
building material dealers		6
development builders		7
contractors		7
department stores		2
home builders		6
not checking this plan at all		19

Established dealers feel generally that they do not want to resort to a wholesaling operation in the channel of distribution, it would add a middle-man cost, partly defeating their low cost objectives. But other companies look for wholesalers to handle their product to relieve them of much of the distribution headaches.

5. DO YOU PLAN TO SELL AT WHOLESALE PRICES TO LOCAL DISTRIBUTORS SUCH AS

	yes
real estate offices	16
building material dealers	10
development builders	12
contractors	11
department stores	4
home builders	11
did not check this plan	10

This seems to be the most generally accepted pattern of distribution. Most manufacturing companies plan to sell houses or parts F.O.B. their factory. The local agent will do what is necessary in the field and makes his own final price accordingly.

6. DO YOU PLAN TO SELL YOUR HOUSE ON A COMMISSION BASIS THROUGH SUCH DISTRIBUTORS AS

	yes
real estate agents	9
building material dealers	6
development builders	9
contractors	7
department stores	3
home builders	7
did not check this plan	18

Where this plan was to be employed a local distributor would get a commission from the manufacturer, but usually local contractors would erect the houses for a set price.

7. WILL YOU DIRECTLY ACQUIRE AND DEVELOP LAND FOR THE PURPOSE OF SELLING LOTS AND HOUSES COMPLETE?

yes	8
no	26
don't know	1
did not answer	2

Obviously most companies plan to avoid the headaches of community development.

8. WILL YOUR LOCAL AGENTS ACQUIRE AND DEVELOP LAND FOR THE PURPOSE OF SELLING LOTS AND HOUSES COMPLETE?

yes	17
no	12
don't know	5
did not answer	3

You can see that while the manufacturer does not intend to develop land himself, he usually expects the local agent to.

9. DO YOU EXPECT TO SELL YOUR PRODUCTS

nationally	9
regionally	17
locally only	9
don't know	2

There were other questions included in the survey but since they dealt primarily with the product and not the distribution of the product they will not be included here.

The "Headlines" conclusions are presented below:

1. Most of the prefab houses will be aimed at the low cost market.
2. Distribution will be more regional than national.
3. The manufacturers need local agents and they prefer Realtors or local builders and developers.

4. Most companies have not given too much thought to land use.
5. The number of prefabricated houses that will be sold is highly problematical. Obviously, the public will need some education to create acceptability, and acceptability is the key to the size of the market.
6. If the idea does catch, there may be a new field for real estate operations in the marketing of the prefabs.

CONCLUSION TO DISTRIBUTION

The whole problem is one about which it is difficult to draw any final conclusions as to what is right and what is the best way to distribute a prefab house. In the preceding pages the writer has attempted to show how the leaders, in some companies, will distribute, or rather how they plan to distribute.

The reason nothing definite can be said is because the right way will emerge only through trial and error. There has not yet been enough activity in the young industry to reach these desired conclusions. Many of the pioneers have different ideas and it is impossible to say which is correct.

The problem is a complex one and involves all of the problems confronting the industry which have been dealt with in previous chapters. It is easy to say, "we will

assume obstacles do not exist such as codes and unions, and proceed from there". But, unfortunately, these problems are ever present and cloud the picture. Perhaps if they were dismissed, the answer would be easy--set up a large network of dealers which you can control similar to the automobile industry. That is what Gunnisson has done. But, Gunnisson can afford to proceed independently and ignore local interests because he has the tremendous financial strength (1) to wage a bitter battle for this independence and subsequent centralized control.

Other smaller companies lacking the necessary money to establish local dealers and train them in Gunnisson style must rely on whatever is there already, be it building material dealers, realtors, or any other existing organization.

By making a builder or materials dealer your local agent you are making an ally out of what might prove to be a stubborn foe. Many building contractors are the same ones who help mould codes in various towns. If it is to their interests to see prefabs advanced they will use their influence to change the codes. Under such a situation it is definitely to the best interest of the manufacturers to make a friend of this man by making him a local agent. Of course in so doing you lose the strong control which people like Gunnisson deem so vital, to existence of prefabricated homes.

(1) Gunnisson Homes is a subsidiary of United States Steel

It is obvious that the picture is fogged by many conflicting interests and only the future will tell what is the best way, the writer has attempted only to present the problems and what the various concerns are doing in the field. One conclusion can be drawn, there are enough companies trying enough alternate plans so that someone is sure to emerge with the right formula.

The expense involved in purchasing a home is so great that few people can ever pay for the whole thing at once, but must rely on credit. The result is that over a period of years, such institutions as Building and Loan Associations, Savings Banks, Insurance Companies, Trust Companies, land banks, builders, National Banks and Cooperative Banks have all engaged in home financing.

The person who wants to purchase a home must put a certain amount down, usually about 20% cash, and the rest can be amortized over a period of years.

The lending institution has as security for the loan, an instrument called a "mortgage". This is a lien against the property for which the loan was made, and if the person borrowing the money does not comply with the provisions which require prompt payments, under certain conditions the property can be sold to satisfy the lien against it.

The institutions and instruments involved in financing the purchase of a home cannot be delved into here for the reason that that is a subject in itself. Suffice it to

say that there is a system which has evolved, whereby a person can purchase a house, and use it while paying for it, over a period of years. The lending institution must approve the home on which they are loaning money. As in all transactions with a bank, the collateral must be of sufficient value to warrant the loan. In periods of money scarcity it is more difficult to procure a loan, as was the case during the great Depression. Because banks were not willing to put money out on risky plans, few people were able to get the necessary money to finance a house. The government stepped into the breach with the Federal Housing Authority. While that Authority did not actually loan the individual the money, it guaranteed to the bank the amount that, if the person did not pay, the government would. With such a guarantee, the banks were willing to advance money.

The situation exists today where virtually all loans on small homes are secured by Federal Housing Authority guarantees. No operative builder would consider erecting houses on which he could not get FHA approval, for he would be doomed to certain loss. So, too, is the case with the prefabricators. In the opinion of the writer no prefabrication company can hope for survival if it does not build a house which can win Federal Housing Authority approval.

The financing of the house, therefore, is not a great problem, because if it has FHA approval, the people

who purchase the house will be able to pay for it if they can muster the down payment. Therefore, most prefabricators make it a big point to stress that their house is FHA approved. The writer has contacted many companies and not one has failed to point out that his has this approval.

Much similar is the situation which exists on veteran's getting loans under the GI Bill. Of course, this must be approved locally, too, and so a certain amount of public relations work must be done. However, it seems that if the houses can be built under the building codes, or the codes relaxed to permit erection of prefabs the banks are willing to go along. This has been the experience thus far, and there seems no reason for it to change.

An interesting experience took place in Naiperville, Indiana (1) recently. Many veterans were returning to this small town with no place to live. Some of the boys tried to buy conventional homes under the GI Bill, but were refused by the bank on the grounds that they were not getting their money's worth.

As is frequently the case, the small town bank had more of a heart than a big city one might, and the local bankers wanted to do something to help this situation for

(1) Clemens, L. H. "Real Estate Loans are made when Homes are Found" Bankers Monthly October 1946

the veterans were desperate. Since no conventional homes could be found or built at a reasonable price, the bank itself turned to prefabricators. In this case they turned to the HomeOla Corporation who provided a satisfactory home at a price which the banks felt they could approve.

The prefabricator even went further to save the veterans' money. The houses were delivered to the site where teams of the boys themselves erected the houses. The HomeOla company always alert to good public relations, supplied a man, free of charge, to supervise the erection.

This is not an isolated case as HomeOla themselves have done much the same thing on numerous occasions. It is excellent public relations, plus the fact that it is a feather in the caps of the manufacturers when their houses are approved over conventionally built ones.

In conclusion, so long as Uncle Sam guarantees the loans and the manufacturers build them according to standards which will win FHA approval, there will be no more of a problem in financing a prefab than a conventional house. In fact, it will be less, because a prefab dealer will have a tie-up with a bank or other lending institution and getting the loan will be routine and therefore save the purchaser much time and red tape.

CHAPTER VII

CONCLUSION

PART I

RECENT DEVELOPMENTS

There are new things being developed daily in the prefabrication industry; a new company enters the field, a new system is devised, or some old prefabricators have found new backers. This is perhaps true of every industry when it first starts out--there is always a great turnover of the companies until one day the industry finds itself firmly established and certain of the companies have emerged as leaders and others have fallen by the way.

However, there have been certain milestones along the path to success for the young industry. As has been pointed out earlier in this thesis, the great depression of the early 1930's gave the industry its first real impetus. From then until the War, prefabricated houses, except in rare cases, seldom got off of the drawing board, but there were numerous experiments and reams of copy written about the wonderful industrialized house of the future.

Another period was entered when the country found itself greatly in need of houses for both war workers and soldiers, and the prefab industry was called upon to do their share. The industry responded well, erecting thousands of units, and doing it in a hurry. It gained production experience and earned money with which to assault the postwar market.

The next step, of course, is the post war market. In this period many new customers have entered the field armed with earnings from war-time endeavors in other fields. Then there is the group who, after war-time experience have decided that prefabrication is not what it is cracked up, to be. The writer realizes that many companies, after war-time experience, have decided against prefabrication and therefore does not want to give the idea that he feels that all one has to do to get rich is to start producing prefabs. This is definitely not the case, for there are many problems yet unsolved which make prefabrication a big gamble.

The most important single development since the war has been the Wyatt program. That program involved the prefab industry to such an extent that the phase of the program which directly effected the industry will be discussed.

It was realized by everyone who could read a newspaper or magazine, when the war ended, that one of the gravest problems facing the nation was the very serious lack of housing. President Truman picked as his man to cope with this major problem, the young, red-tape cutting, fire-brand Mayor of Louisville, Kentucky, Wilson Wyatt. Mr. Wyatt was bedecked with more power than perhaps any man in the country, other than the president himself.

On February 7, 1946 Mr. Wyatt, after making plans for five weeks, issued his report to the president on what he intended to do to lick the housing shortage. The president,

when he had appointed Mr. Wyatt, had used the expression "make no little plans" and Mr. Wyatt took him at his word, and had "made no little plans" and sent them to the president for approval. Mr. Truman agreed to the plan with the words, "He has recommended a Veterans Emergency Housing Program which is bold, vigorous, and imminently practical. It has the complete and unqualified support of the Administration". (1)

No small part of this bold and vigorous program directly concerned the prefabricated house industry. The president said further, "We will need to stimulate a large program of factory fabricated homes". These were the words of the President of the United States, and it certainly looked as if the day the prefabricators had been waiting for had at last arrived.

The government wanted 250,000 prefabs in 1946, and 600,000 more in 1947. In order to stimulate private capital to enter the field, the government was to loan money through the Reconstruction Finance Corporation, and they would then guarantee the sale of the houses once they were produced. In order to qualify for a government purchase contract the firm had to establish that (2)

A. It was prepared to produce a house

(1) From the text of Truman's statement on "Housing", New York Times, February 9, 1946

(2) Information on Wyatt program taken from text of the actual statement to the President, Feb. 1946

which had been approved by the government as meeting sound and tested standards of safety, durability, liveability and health.

B. It would be a low-priced house to sell for about \$3500 for a one-bedroom house, and \$500 more for each additional bedroom, F. O. B. the factory.

C. The producer had formulated a plan for distribution and erection of the houses.

D. He can and will produce a specified number of houses for the calendar year following the contract.

Under the terms of the market contract, the government would take delivery of houses only after the producer had tried for a reasonable amount of time to sell them. When and if, the government took them over they would be sold to veterans in a manner similar to surplus property.

The prospects for the prefab industry seemed to be so bright at this point that it caused Mr. Truman to say, "We can create in a brief period a mass production building industry comparable in size, in opportunity for investment and employment, with the automobile industry in the nineteen twenties". (1) That was the feeling when Mr. Wyatt started his job as Housing Expediter.

If Mr. Wyatt had retained his job for long, perhaps all of the wonderful predictions made for the prefabrication industry would have been realized, and it might have emerged

(1) New York Times, February 9, 1946

with one great leap as a major industry, instead of having to tread the long hard road as other industries were forced to, and now it must.

Mr. Wyatt had said that to do his job he would need war-time powers, but it was not war, and the people would not, and did not behave as if it were. Mr. Wyatt succeeded in getting many houses started, but there was always something missing which kept them from being completed. (1) By early Fall, 1946, everyone it seemed, was out for Mr. Wyatt's scalp, and every type of verbal abuse had been heaped upon the poor chap after he had been drafted for the job.

Wilson Wyatt resigned in December, 1946 because his program had been shot full of holes. There had been many active, tangible lobby and pressure groups, such as the powerful real estate group, which had been out to wreck his program. Some of the veterans' groups that one would have thought would be his staunchest supporters were his severest critics. (2) But his worst enemies were the moods and attitudes of a people sick and fed up with war time restrictions and government intervention who wanted to let things run their own course for a while. As the editors of Fortune so aptly phrased it, "the public was tired of emergencies priorities, ceilings, allocations, directives, and exploiting

(1) "The Housing Mess" Fortune January 1947
(2) Ibid.

all featured in Mr. Wyatt's approach to the housing shortage". (1) "The only thing the American people wanted to expedite in 1946 was a return to normalcy, which they did at the first opportunity by voting for a shortage of Democrats".

There were many preliminary fights, all contributing to the downfall of the once mighty Wyatt program. However, the final blow was dealt when the Reconstruction Finance Corporation refused to play ball with Mr. Wyatt in his drive to establish the prefab industry. Mr. Allen of the RFC and M. B. Wyatt battled long and loud and the fight was carried right to the White House where Mr. Wyatt, tired of being the goat and not getting the cooperation he had been promised, threw the president's words of "bold, vigorous and practical" right in the face of the President.

The battle with the RFC was closely associated with another fight which Wyatt was waging simultaneously with the War Assets Administration. The Lustron Company, a prefab company that had applied for a loan and purchase contract was the center of both squabbles. Wyatt wanted to sell the Dodge-Chrysler plant to Lustron, but the War Assets Administration refused, saying that they had promised to lease the plant to the Tucker Auto Corporation.

(1) "The Housing Mes" Fortune, January 1947

Lustron had asked for a loan of fifty million from the Reconstruction Finance Corporation. Mr. Allen pointed out that Lustron was putting up only \$36,000 and stood to make fabulous amounts while they risked nothing. Mr. Wyatt countered with the statement that this was a period of extreme emergency and conventional banking policies must be out the window. President Truman decided in favor of his close friend George Allen, and Mr. Wyatt resigned. (1)

Exactly what had Mr. Wyatt accomplished in the short time he was in office so far as putting the prefabrication industry on its feet is the thing that is important so far as this paper is concerned. His short range affect can be fairly well reported, but the long range effects can only be guessed and proven right or wrong by time. Before he left office there were definite purchase contracts made for 52,900 prefabricated houses and the government was committed for 92,300 others. Consolidated and Douglas Aircraft companies were set and ready to actively start producing homes. There were many companies who had proceeded so far along the road that there was no turning back, and the production of prefabs still might reach 450,000 according to the National Housing Authority, (2) in 1947.

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- (1) Fortune January 1947
(2) Ibid.

(1) Architectural Forum January 1947

There are many who claim that Wyatt might have been the father of prefabrication. But there are others who do not share this opinion. Strange as it seems, many of the old time prefabricators were glad to see Mr. Wyatt go. (1) While he was in office they refused to have much to do with his program, but preferred to secure their own capital and to risk marketing the houses themselves. These men were opposed to Wyatt because they were afraid he would fill the field with men who were merely out to make a quick dollar with the government taking all the risks, and would hurt the prefab cause in the long run. This is certainly logical thinking because it is certain that the government paying the bill would interest many new companies in getting into the field, who had no intentions of staying there in the future, just as was the case during the war. However it does seem to the writer that if Mr. Wyatt had been able to hang on a while longer, and had continued to establish prefabs, that he would have put some concerns into the field who would have been a credit to the industry and who would have built many houses. So long as the companies that built the houses had turned out good products and the government could see to that, because they had to approve the houses, the result would have been a healthy one for the industry.

(1) Architectural Forum January 1947

Nothing succeeds like success, and if enough people lived in, and liked prefabs, others would want them too, and the industry would have been well established. As it is, they still have a long, hard struggle ahead of them, with many obstacles to overcome.

PART II

CONCLUSION

After doing much research in the prefabricated field the writer has reached some general conclusions.

It was disheartening to find that the industry is much further along on paper and in talk than in producing homes. Two supposed major plants were visited only to find one not in production at all, and the other, a small company employing only fifty men in a very small factory. These two companies are mentioned in almost every article when leading prefabricators are mentioned, which leads one to think, are the rest like this?

In addition to these plants, visits to many companies were contacted by mail and only very few were actually producing houses. Those that were, were operating in a very limited area.

While this is disheartening, there is something healthy about it, also, because many of these companies could produce houses of a sort. However, the companies are not willing to do this. They choose to wait until enough

material is available to produce good houses which will be a credit to the company and to the industry, for they are fully aware that the industry will perhaps live or die on the strength of what it produces in the next few years.

Will the prefabricated house industry succeed?

This is a logical question which many people have asked the writer and which he cannot answer. It would take a prophet to see into the future to answer this question. It is not a mathematics problem which can be worked out to a successful conclusion, and reach one answer and that be the right one. There are too many complex, inter-dependent "ifs" which must first be answered, and which can only be answered by time.

It has been stated earlier in this thesis that for any business to survive and prosper there must be a need for it. There is certainly a need for housing, but that alone does not mean there is a need, under normal conditions, for prefabs. The average person, if he must pay the same price, will choose a conventionally, custom-built house. Herein lies the biggest "if" confronting the prefab industry. Theoretically, producing houses in a factory under mass production methods should produce a house of similar quality at a lower price, but will it? The industry must prove this. If it can, then by all means the industry will certainly choose the house of lower price if the quality is the same.

The second big question is the people themselves. In order to fully utilize prefab benefits the people must change their ideas of what a house should look like. If they will be objective and choose a house for the benefits it offers at the price, and will forget style and design, as they now know it, then the industry will really give them a good house at a low price.

It is the writer's opinion that the people themselves, the ones who will most benefit from prefab are the ones doing the most to retard it. If the people will accept a round house, or an aluminum or a plastic house if one is proven satisfactory, then they will reap the benefits of prefabrication. So long as prefabs are forced to produce conventional houses, the benefits of mass production will not arrive. To be sure, there will be savings, but not to the extent that there could otherwise be.

The outlook is by no means dark. The prefab industry suffered a setback under their first start, in producing a house of radical design, which the people were not ready for or willing to accept. They became wiser and now most companies are turning out conventional looking houses. Yet, there are enough companies manufacturing radical designs, such as B. Fuller and Lincoln so that if the people will accept it, it will be there.

It must be carried in mind that merely because Americans would not accept radicals once, that they still will not. In 1936 Chrysler almost went broke with his "airflow" car,

a futuristic streamline which did not catch on. However, by 1942 almost every car was as radical as the Airflow had been, but they had arrived there gradually. So, too, must the prefabricated houses gradually change its design at a pace slow enough so that it will be acceptable to the public. Gradually roofs can slant and lines can become a bit more severe gradually, until one day, the people will realize that the house they are living in is the one they had rejected not long ago.

This sort of development which the writer predicts for the prefabs is not peculiar to housing alone. It is happening every day in every phase of life. Even in government it is apparent. It is certain that if Franklin D. Roosevelt had proposed his New Deal projects thirty years ago, he would have been called a radical or socialistic, or perhaps even a representative of the Kremlin. However, when they were proposed a little over a decade ago they were accepted as natural functions of government. And so it shall be in the housing field.

Finally, in advocating an industrialized housing industry the writer is thinking of something even larger than better homes for less money. Many great minds feel that our whole economy is thrown out of kilter by the residential construction industry. The conventional method has tried for years to solve the problem, only to have the building dollar buy less and less as the costs have increased.

It is time that something new be tried. The writer feels this something new should be the modernization of an out-moded, decadent, archaic housing industry.

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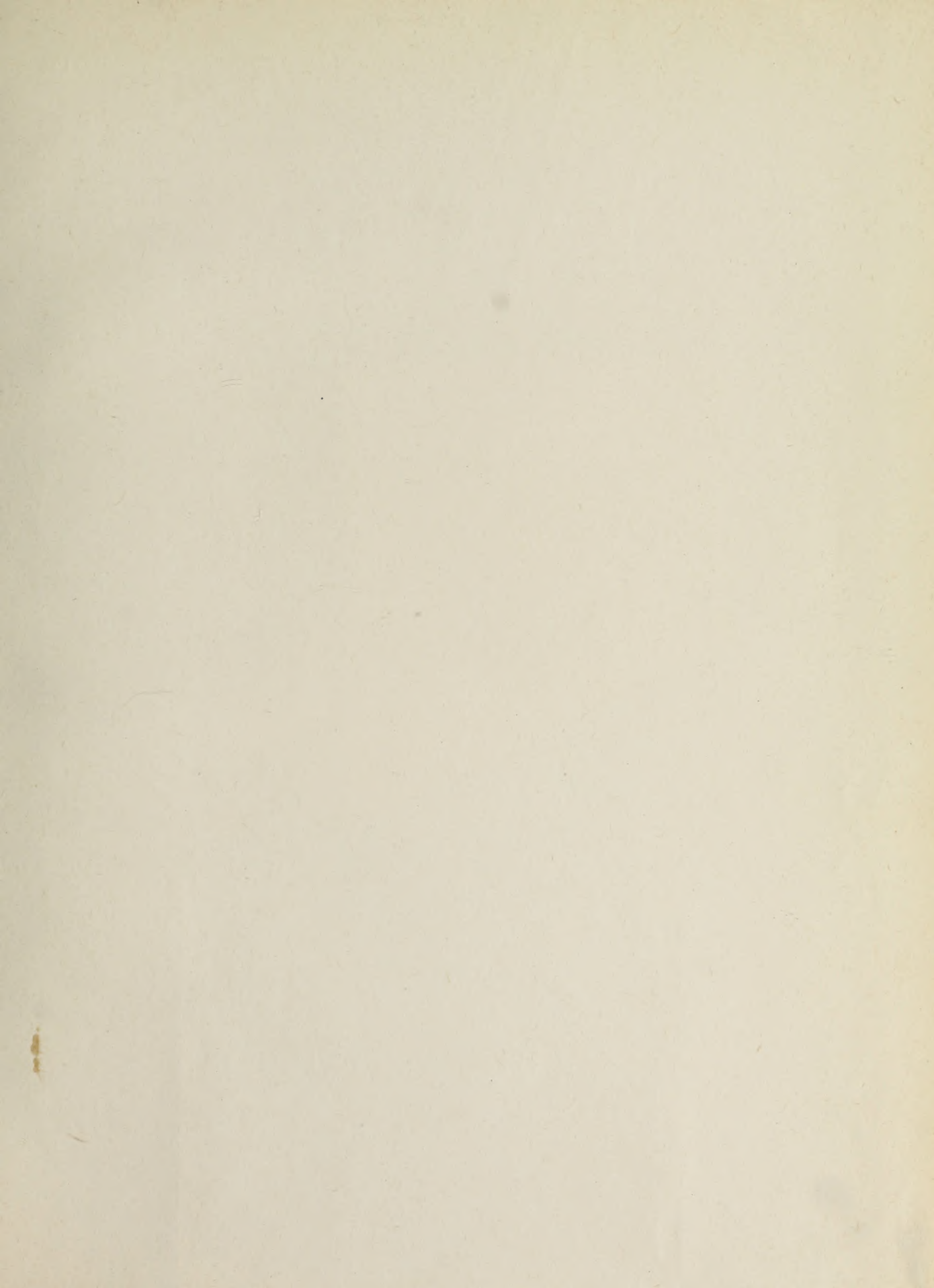
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